INSTALLATION & OPERATION MANUAL

Part No.: M08014307009
Literature No.: MAC1211-A1

Modular Air Cooled Chiller/Heat Pump

AMAC210 DM5/DS5/DRM5/DRS5

AMAC230 DM5/DS5/DRM5/DRS5

HFC 410A
ECOLOGICAL REFRIGERANT

ACSON® International

Please appropriately keep this manual
Please carefully read this manual before installing or using

Table of Contents

1 Safety Considerations 1

2 Product Information 5

2.1 Features 5

2.2 Nomenclature 6

2.3 Unit Main Parts 7

3 Specifications 8

3.1 Specification Parameters 8

3.2 Operating Temperature Range 9

3.3 Reference Table for Performance Parameters 10

3.4 Water Pressure Drop 11

3.5 Dimensions 12

4 Installation 13

4.1 Machine Installation Space 13

4.2 Hoisting Chillers 15

4.3 Installing chilled water unit 15

4.4 Electrical Wiring 16

4.5 Connecting Water Pipes 19

4.6 Pipe Design for the Air-Conditioning System 22

4.7 Water Storage Tank Volume Calculating 23

4.8 Calculating volume of expansion water tank 24

4.9 Model Selection Principles for the Water Circulation Pump 24

5 User Manual for Controller 25

5.1 Features of the Controller 25

5.2 Size of the Controller 25

5.3 Functions of the Controller 26

5.4 Controller Settings 27

5.5 Controller Installation 28

5.6 Controller Stoppage Code 29

6 Commissioning and Operation 30

6.1 Items to be Confirmed Before Turning on Unit 30

6.2 Items to be Checked during the Pilot Run 31

7 Repair and Maintenance 32

7.1 Repair 32

7.2 Maintenance 33

8 Stoppage and Handling 34

8.1 Stoppage Code and Running Status 34

8.2 Cause for failure and troubleshooting 35

9 Water Quality Management 42

9.1 Water Quality Requirements 42

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9.2 Water Processing Method.....42
10 Notice to Users 44
11 After sales Services & Warranty 46
12 Maintenance (Repair) Record..... 47

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1 Safety precautions

Read this chapter carefully before using the unit.

⚠ **Caution:** This symbol represents an operation which can cause lethal or major injuries if not correctly performed.

⚠ **Note:** This symbol represents an operation that can cause damage to the unit or bodily injury if not correctly performed.

This symbol represents important instructions that must be followed.

This symbol represents forbidden operations.

■ Points for Attention for Installation and Usage

To make the unit work with the optimal performance, the following instructions must be followed and non-conformances must be rectified before starting the unit.

⚠ Warning

■ Installation and maintenance must be performed by professional customer service personnel from the Company.
Installation and maintenance must be performed by specially trained and certificated professional customer service personnel.

■ Installation must be performed according to the user manual.
Incorrect installation can cause accidents such as damage to the unit, refrigerant leakage, electric shock or fire.

■ Proper measures must be taken to protect the unit against strong wind and earthquake during the installation;
otherwise the unit might fall off and cause accidents.

■ The installation groundwork must be strong enough.
The unit must be installed on a strong groundwork to prevent the unit from falling off and causing accidents.

■ Optional parts must be installed by professional customer service personnel.
Customers can select only optional parts that are recommended by the Company; otherwise electric shock or fire might be incurred.

■ Measures must be taken to prevent refrigerant leakage.
When a unit is installed indoor, concrete measures must be taken to prevent refrigerant leakage. If the refrigerant leaks and the density of the refrigerant in the air reaches a certain threshold, people might be suffocated.

■ Electric parts must be protected against moisture;
otherwise, electric shock, fire and other accidents might be incurred.

■ A dedicated circuit must be designed and installed by professional customer service personnel.
Electric installation must meet the Electric Equipment Engineering Standards and Indoor Electric Equipment Wiring Specifications. Power cables of incorrect specifications may incur electric leakage, fire or other accidents.

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Caution

Installation Precautions

- Hot and cold water that is used must meet the water quality requirements.
  If the water quality does not meet the specified requirements, the durability and performance of the unit may be degraded and water leakage may occur in serious situations.
  For details about the water quality requirements, see 9.1 Water Quality Requirements.
- Do not use refrigerant or anti-free oil of the incorrect model;
  otherwise fire or explosion may be incurred.
- The electric leakage breaker must be correct configured.
  The electric leakage breaker must be installed according to the electric specifications; incorrect installation might cause electric shock.
- The power cable must not be too tight;
  otherwise the cable might break and cause fire or other accidents.
- The unit must be properly grounded.
  The grounding line must not be connected to the gas pipe, water pipe, lightning-proof rods or telephone lines. Incorrect grounding method may cause electric shock accidents.
- The voltage fluctuations of the power supply must not exceed ±10% of the rated voltage. The power cable must be separated from welder transformers which could cause great voltage fluctuations.
- Do not touch the compressor and high-temperature parts of the refrigerant circuit.
  They may cause burning injuries.
- Do not touch cutting edges and heat exchanger fins.
  Avoid contact with cutting edges and coil surfaces which may cause bodily injuries.
- Select an installation site where water can be smoothly discharged.
  If water cannot be smoothly discharged, the unit might be affected by moisture.
- Prepare protective equipment and installation tools.
  Personal protective equipment such as gloves and work uniforms can help to prevent accidental bodily injuries.
- The unit must not be installed in a harsh environment.
  Do not install the unit in dirty, grimy, salty or sulfured places.
- Do not install the unit in a place with possible gas leakage.
  Leaked gas around the unit might cause accidents such as fire or explosion.
- Properly protective measures must be taken before installing a unit in a hospital, near a communication base station or similar places.
  Frequency converters, electric generators, high-frequency medical equipment, and wireless communication devices can affect the performance of the unit or cause the unit to fail.
- The unit must be moved with great caution.
  A unit that is heavier than 20 kg cannot be moved by one person alone, and must be moved with special Machinery.

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Caution

Usage Considerations

- Do not turning on or off the unit by directly turning on the power supply switch;
  otherwise a fire or electric shock accident may be incurred.
- Do not change the settings of safety devices;
  otherwise fire or explosion may be incurred.
- Do not use a fuse that exceeds the upper currency limit.
  If the fuse is replaced with a wire or other conductors, the unit may be damaged and a fire may be incurred.
- Do not short the safety device to shut down the unit;
  otherwise a fire or explosion may be incurred and the unit may be damaged.
- Do not use the unit for purposes other than it is intended for.
  The unit is not intended to store food, animal or plant, precision equipment or art objects. Storing these objects using the unit may degrade the quality of these objects.
- Shut down the unit and cut off the power supply before any maintenance work;
  otherwise a fire and bodily injury may be incurred.
- Drain the water in the unit if the unit is to be suspended for a long time.
  If the unit is to be suspended for a long time, fill the water pipes with antifreeze or drain the water from the unit;
  otherwise the unit might be frozen and burst.
- Do not pile or hang anything on the unit.
  If you pile or hung anything on the unit, the object may fall and cause accidents.
- Do not operate the unit with a wet hand;
  otherwise an electric shock may be incurred.
- Do not touch revolving parts of the unit;
  otherwise a bodily injury may be incurred.
- If the unit malfunctions, cut off the power supply and contact the dealer for help immediately.

Considerations for Injecting the **R410** refrigerant

- Fill the unit with liquid refrigerant.
  Gas refrigerant may change and degrade the performance of the unit.
- Do not use the original refrigerant circuit.
  The original refrigerant circuit contains refrigerant and antifreeze that contains Chloride which may degrade the antifreeze oil of the new unit.

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This manual is intended for the current products of ACSON International. Product design and structures are subject to change without further notice.

2 Product Information

2.1 Features

■ Overview

ACSON AMAC series air-cooled chilled-water heat pump units are highly reliable, secure and flexible.

This series of units are elaborately designed to be delicate and elegant. In addition, they are so flexible that they support fan coils and air handling units of various specifications and models.

Units of this series are marked for their high efficiency, low noise, user-friendliness, secure operation, easy installation and maintenance etc, and are widely used in factories, stations, hotels, villas, office buildings, top-grade residences etc. Besides, they can also be used in industrial chilling.

■ Multi-grade Modulation

AMAC210/230 series units feature 2-grade modulation which can be transformed to multi-grade modulations in modular combinations. For example, 8 AMAC210 units can realize 16 modulation grades with effects very similar to that of stepless modulation. With operation grades controlled electronically, the unit exerts less shock to the power grid and saves more energy.

■ Outstanding Performance

AMAC series units feature leading-edge technologies and name-brand accessories which are strictly tested for compatibility. Fully hermetic volute compressor and low-noise fans minimize the operation noise. With efficient volute compressors and precise throttling systems with electronic expansion valves, the units feature high EER and COP, especially at partial workload.

■ Easy Control

Units can be controlled individually or together by an electronic controller. The controller is strongly interference proof and can exert control from as far as 1000 meters away. Failures are represented by error codes displayed on the controller to facilitate troubleshooting.

■ Easy Installation

The units are designed to best facilitate user installation. The cooling system is made hermetic in the factory. Customers do not need to connect any copper pipe or refill refrigerant. The water system has an inlet connector which is to be connected to the terminal equipment. Having installed the unit as instructed, customers just need to check that water and pump pipes are clean before pumping water and powering on the unit.

■ Defrosting

The controller defrosts the unit automatically according to the operation time of the unit and the temperature of the heat exchanger.

■ Security Measures

The cooling system is protected against extreme pressures: discharge pressure will not be too high, nor will inhaling pressure be too low; against extreme discharge temperature: discharge temperature will not be too high; against freezing during cooling operation: when the water temperature is too low, the plate heat exchanger will not freeze up or burst internally; and against low temperature: during cold winter time, the water pipe and plate heat exchanger will not freeze up or burst internally (This feature works only when the system is working in the heating mode with the main power supply

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turned on).

■ Highly Adaptive

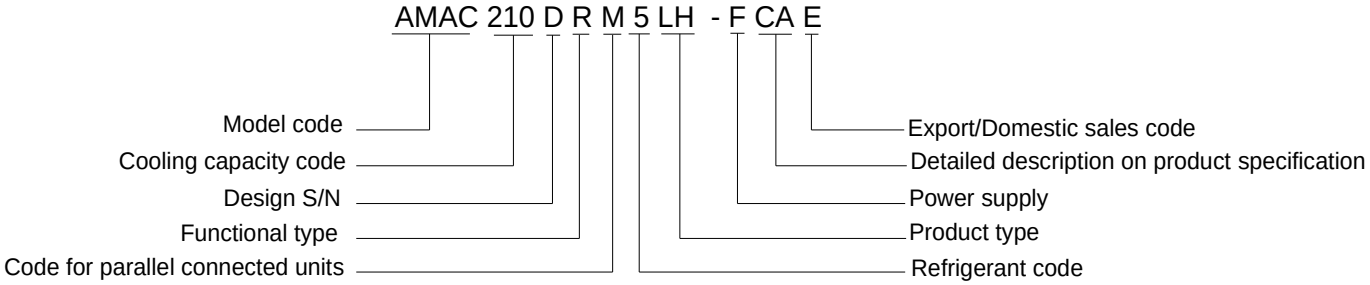
The unit shell is made of galvanized, phosphorized steel plate with pure polyester plating to withstand weathering. The unit is reasonably designed to save space. It can be mounted on walls, balconies or the roof, thus eliminating the need for a dedicated equipment room.

The unit is highly adaptive and can operate smoothly in hostile conditions such as extremely high or low temperatures.

■ Easy Maintenance

To access and service any part of the unit, you just need to dismantle the side panel or the front panel. When the unit stops working abnormally, the controller prompts the reason to facilitate troubleshooting.

2.2 Nomenclature



Model code —— ACSON Brand,AMAC, AMACS, etc.

Cooling capacity code —— 050, 080, 150, etc.

Design S/N —— A, B, C, etc.

Functional type —— R: heat pump; omitted in chiller

Code for parallel connected units —— For modular air-cooled chiller (heat pump) unit,
M: master unit; S: slave unit
For single unit, this code is omitted.

Refrigerant code —— 3: R134a; 4: R407C; 5: R410A; R22: omitted

Model —— Standard model: omitted;
LC: standard model for cooling in low temperature;
LH: standard model for heating in low temperature
SR: total heat recovery

Power supply features —— F: 380-415V/3N~/50Hz; A: 220-240V~/50Hz

Detailed description on product specification —— AA, AB, AC, ZZ,etc.

Export/Domestic sales code —— omitted: China; B: Australia; M: Mexico;
U: America; E: Other region, etc.

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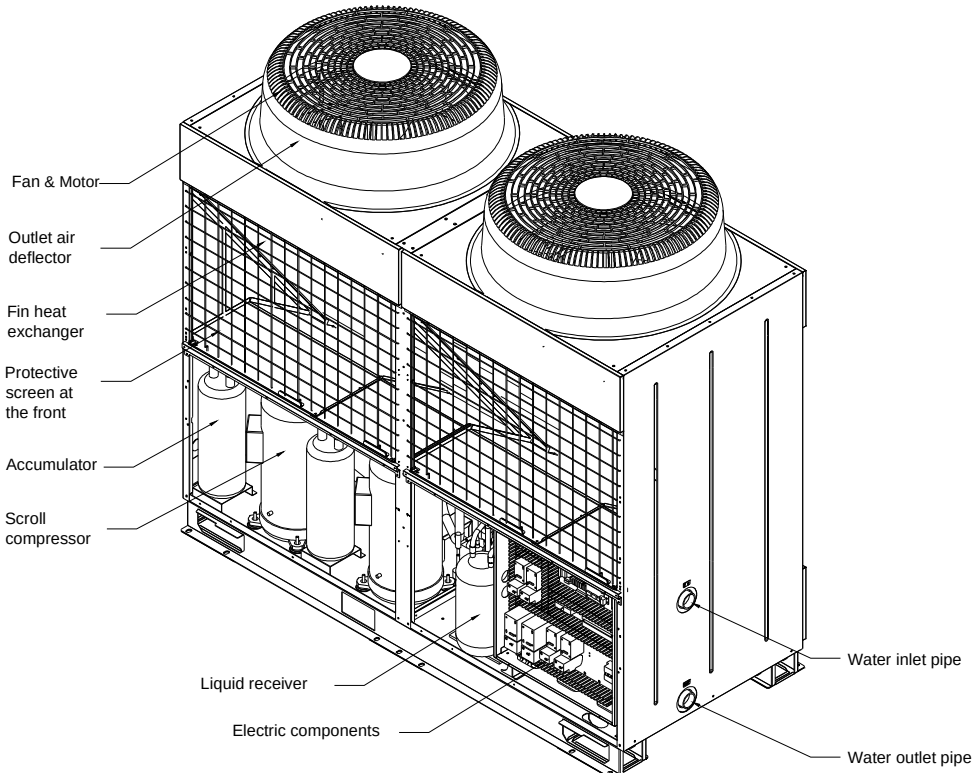
2.3 Unit Main Parts

■ **Modular Air Cooled Chiller/Heat Pump**

AMAC210DM5/DS5 AMAC210DRM5/DRS5

AMAC230DM5/DS5 AMAC230DRM5/DRS5



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3 Specifications

3.1 Specification Parameters

Model			AMAC210D5	AMAC210DR5	AMAC230D5	AMAC230DR5
Nominal cooling capacity		kW	60.0	60.0	65.0	68.0
Nominal heating capacity		kW	--	64.0	--	66.0
Cooling input power		kW	18.8	19.8	19.2	20.1
Cooling operation current		A	35.5	37.2	36.9	36.8
Heating input power		kW	--	20.5	--	20.0
Heating operation current		A	--	38.2	--	36.7
Performance parameter		-	3.19	3.03	3.39	3.38
Efficiency Grade		-	3	3	2	2
Power supply		-	380-415V/3N~/50Hz			
Compressor	Type	-	Hermetic scroll compressor			
	Quantity	Unit	2			
Fan	Type	-	Broad wheel axial fans with low noise			
	Quantity	Unit	2			
	H/L power input	kW	1.15x2 / 0.45x2			
Heat exchanger	Type	-	Efficient plate heat exchanger			
	Water flow (cooling)	m^3/h	10.3	10.3	11.2	11.7
	Water flow (heating)	m^3/h	--	11.0	--	11.4
Unit WPD		kPa	38.0	38.0	44.0	37.3
Water pipe connection size		mm	⩾DN50			
Designed maximum temperature difference between input and output water		℃	7			
Unit dimensions	Length ×Width ×Height	mm	1990×840×1840			
Running weight		kg	530	555	530	525
Unit weight		kg	520	540	520	515

Note: 1. Nominal Refrigerating Capacity Condition: Out-flowing water temperature 7℃, water flow 0.172 [m^3/(h•kW)], Outdoor temperature 35℃.

2. Nominal Heating Capacity Condition: Out-flowing water temperature 45℃, water flow 0.172[m^3/(h•kW)], Outdoor dry-bulb temperature 7℃, wet bulb temperat ure 6℃.

3. The specifications given in the table will be subject to the modifications on product design by the manufacturer. No notice will be further given.

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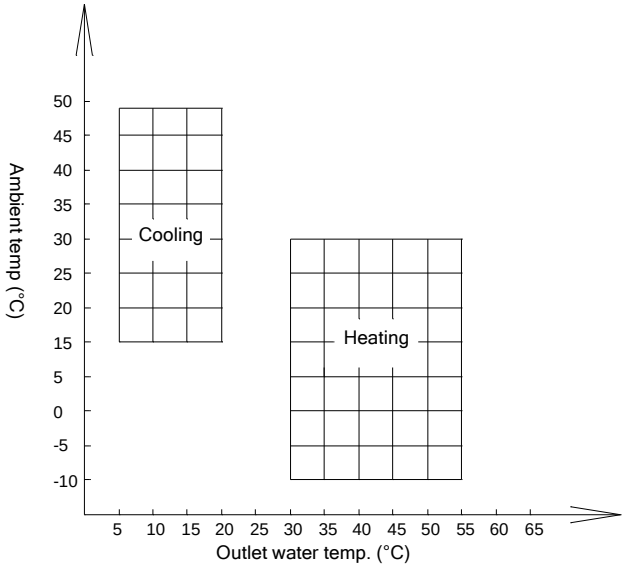
3.2 Operating Temperature Range

■ Operating Temperature Range



Note: Ensure that the water flow is within the specified range. If the water flow is too small, scale may accumulate and degrade the performance of the unit, cause the antifreeze device to activate, or cause rust points and refrigerant leakage. If the water flow is too large, the unit may be corroded due to water impact.

■ Water flow range

Model		AMAC210DM5/DS5	AMAC210DRM5/DRS5	AMAC230DM5/DS5	AMAC230DRM5/DRS5
Flow range	Max. value (m^3/h)	13.4	13.4	14.6	15.0
	Rated value (m^3/h)	10.3	10.3	11.2	11.52
	Min. value ($m^{3/}$h)	7.2	7.2	7.8	8.0

■ Working Conditions

Item	Description
Power supply voltage	Rated voltage ±10%
Power supply frequency	Rated frequency ±1%
Variations between phases	Rated voltage ±2%
Air quality	Must not contain solute that can corrode copper, aluminum or iron.
Flow rate of chilled water	0.5 - 2.0m/s
Pressure of chilled water	< 0.7Mpa
Quality of chilled water	Must not contain solute that can corrode copper, iron, or welding material. For details on the water quality requirements, see Chapter 9: Water Quality Management (page 42).
Installation site	Take anti-snow and ventilation measures as required.
Ambient temp.	Refer to the figure above.
Relative humidity	<90%

Note:

1. The unit is strictly tested before delivery and can work safely in the rated working conditions.
2. For the performance parameters of the unit in different working conditions, see 3.3 Reference Table for Performance Parameters.
3. This is the normal operating temperature range for the unit. Beyond this temperature range, the unit can only operate for a short moment before a failure alarm is triggered.

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3.3 Reference Table for Performance Parameters

■ Cooling Capacity Variation Table

Model	Outlet water temp (℃)	Ambient temp. (℃)															
		15℃		20℃		25℃		30℃		35℃		40℃		45℃		48℃	
		Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)	Cooling capacity (kW)	Power (kW)
AMAC 210D5	5	70.6	13.6	66.5	14.7	62.9	16	59.4	17.2	55.3	18.5	50.9	20.1	46.3	21.8	42.4	23.1
	7	75	13.8	71	14.9	66.9	16.3	63.4	17.5	60.0	18.8	55.6	20.4	50.9	22.1	46.9	23.4
	9	79.8	14.1	75.7	15.2	71.6	16.5	68.4	17.8	64.9	19	60.8	20.7	55.8	22.4	51	23.7
	12	86.7	14.6	82.5	15.7	78.6	17	75	18.3	71.6	19.5	67.2	21.3	61.8	23	56.7	24.1
	15	93	14.9	89.7	16.1	86.5	17.4	82.6	18.7	78.7	20	73.7	21.9	68	23.7	63.5	24.7
	20	103.5	15.4	101.7	16.8	99.7	18.1	95.3	19.4	90.5	20.8	84.5	22.9	78.3	24.9	74.8	25.7
AMAC 210R5	5	67.0	14.6	65.0	15.7	62.9	16.7	59.8	18.0	56.3	19.4	51.7	21.1	47.4	22.9	42.8	24.3
	7	71.3	15.0	69.3	16.1	67.3	17.1	64.1	18.4	60.0	19.8	55.8	21.6	50.9	23.3	46.4	24.9
	9	75.8	15.5	73.8	16.5	71.2	17.5	67.9	18.7	64.2	20.2	59.8	22.0	54.7	23.7	50.3	25.1
	12	83.2	16.0	81.3	16.9	78.8	18.1	75.5	19.0	70.6	20.7	66.1	22.4	60.8	24.1	56.3	25.5
	15	91.1	16.6	89.4	17.6	86.6	18.6	82.9	19.7	78.3	21.1	73.0	22.9	67.7	24.7	62.4	26.0
	20	104.2	17.8	102.8	18.7	99.8	19.4	95.2	20.8	91.1	21.9	84.5	23.7	79.2	25.6	72.6	26.8
AMAC 230D5	5	72.5	14.2	70.3	15.2	68.1	16.2	64.7	17.4	60.9	18.8	56	20.5	51.3	22.2	46.3	23.6
	7	77.2	14.6	75	15.6	72.8	16.6	69.4	17.8	65.0	19.2	60.4	21	55.1	22.6	50.2	24.1
	9	82	15	79.9	16	77.1	17	73.5	18.1	69.5	19.6	64.7	21.3	59.3	23	54.4	24.3
	12	90.1	15.5	88	16.4	85.3	17.5	81.7	18.5	76.4	20	71.6	21.7	65.8	23.4	60.9	24.8
	15	98.6	16.1	96.7	17.1	93.8	18	89.7	19.1	84.7	20.5	79.1	22.2	73.3	23.9	67.6	25.2
	20	112.8	17.1	111.2	18.3	108	18.8	103	20.1	98.5	21.3	91.6	23	85.8	24.7	78.8	25.9
AMAC 230R5	5	74.5	14.9	70.6	15.9	66.7	16.9	64	18.3	61.3	19.6	56.3	21.6	51.3	23.5	48.3	24.7
	7	79	15.4	75.4	16.4	71.8	17.3	69.4	18.7	68.0	20.1	61.1	21.9	55.3	23.8	51.7	25
	9	83.7	15.9	80.1	16.8	76.5	17.8	73.9	19.1	71.3	20.5	65.4	22.4	59.5	24.3	55.9	25.4
	12	90.7	16.6	87.1	17.5	83.6	18.4	80.6	19.8	77.7	21.2	71.7	23	65.8	24.9	62.2	26
	15	96.9	17.2	93.7	18.1	90.5	19	87.4	20.5	84.2	21.9	78.3	23.8	72.4	25.6	68.8	26.7
	20	105.1	17.8	102.5	18.7	99.8	19.7	97.2	21.2	94.6	22.8	88	24.5	81.4	26.2	77.4	27.2

■ Heating Capacity Variation Table

Model	Outlet water Temp (℃)	Ambient temp. (℃)															
		-10℃		-5℃		0℃		7℃		10℃		15℃		21℃		30℃	
		Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)	Heating capacity (kW)	Power (kW)
AMAC 210DR5	30	42.6	15.0	50.7	15.2	60.8	15.4	69.8	15.5	73.4	15.7	78.2	16.0	82.9	16.3	90.0	16.7
	35	41.5	16.6	49.0	16.7	58.3	16.9	67.8	17.1	71.5	17.3	75.8	17.5	80.7	17.7	88.1	18.0
	40	40.3	18.1	47.4	18.2	55.8	18.4	65.9	18.7	69.6	18.9	73.5	19.0	78.6	19.1	86.3	19.2
	45	39.1	19.7	46.0	19.9	53.9	20.3	64.0	20.5	67.2	20.7	71.3	20.9	76.3	21.1	83.8	21.3
	50	38.4	21.4	44.2	21.8	51.4	22.0	60.5	22.2	64.1	22.4	68.9	22.6	73.2	22.8	80.7	23.0
	55	37.3	23.5	42.8	24.0	48.3	24.3	57.4	24.5	61.0	24.6	65.6	24.7	70.5	24.8	77.9	25.0
AMAC 230DR5	30	42.1	14.6	47.6	14.7	55.1	15.0	70.0	15.1	71.0	15.2	72.6	15.3	80.8	15.4	88.3	15.6
	35	41.1	16.0	46.3	16.2	53.9	16.3	68.6	16.6	69.7	16.7	71.5	16.7	79.9	17.0	87.9	17.2
	40	39.9	17.5	44.9	17.6	52.4	17.9	67.4	18.1	68.4	18.3	70.2	18.4	78.7	18.6	86.8	18.8
	45	38.5	19.4	43.4	19.6	51.1	19.8	66.0	20.0	67.1	20.1	68.8	20.3	77.3	20.5	85.7	20.7
	50	37.7	21.3	42.3	21.5	49.4	21.7	63.9	21.9	65.0	22.0	67.0	22.2	75.5	22.5	84.3	22.6
	55	36.4	23.4	40.7	23.7	47.9	23.9	61.7	24.0	63.0	24.2	65.2	24.4	73.8	24.7	82.6	24.9

Note: Parameters in the above table are measured when the unit operates at the rated water flow.

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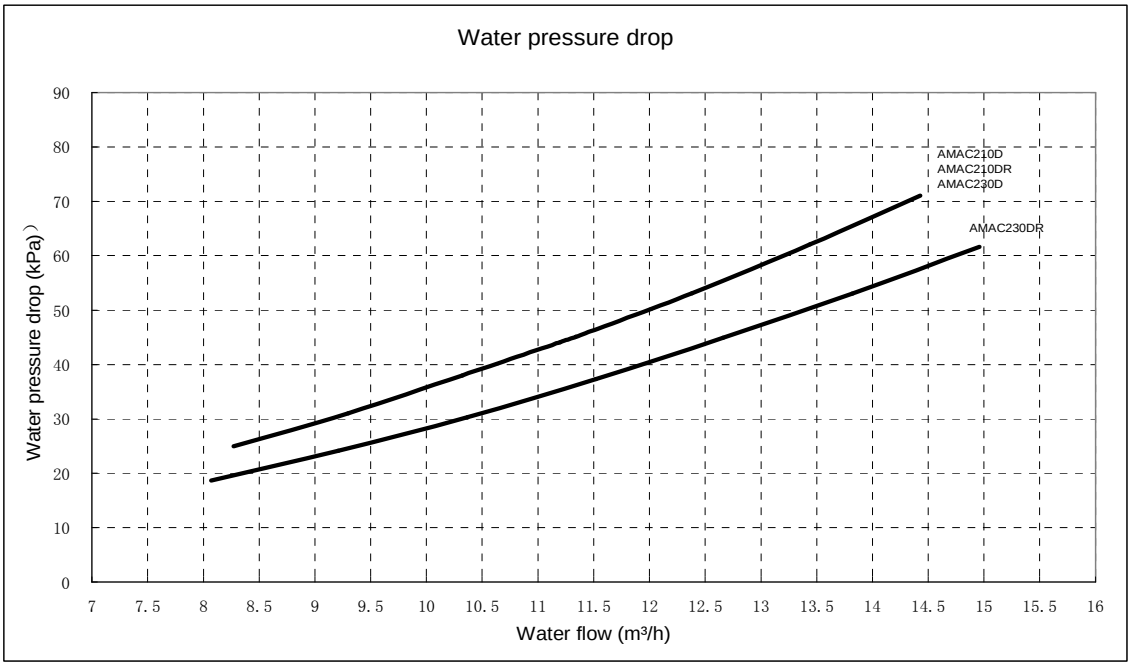
3.4 Water Pressure Drop

■ Curve for Water Pressure Drop



Note:

1) The water pressure drop of the unit is the test result when a plate heat exchanger and the accessory Y-shaped filter are installed.
2) The water resistance of the plate heat exchanger and the Y-shaped filter are tested with pure water.If the onsite water quality changes, the test result may be different from that shown in the figure.

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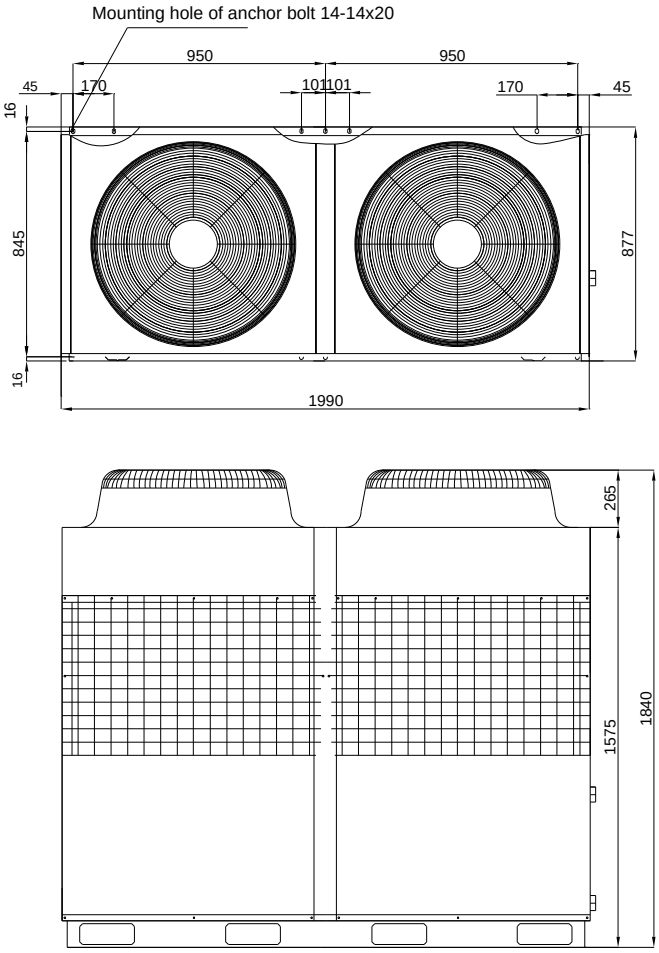
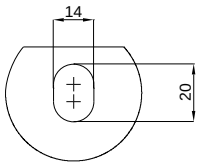
3.5 Dimensions

■ Modular Air Cooled Chiller/Heat Pump

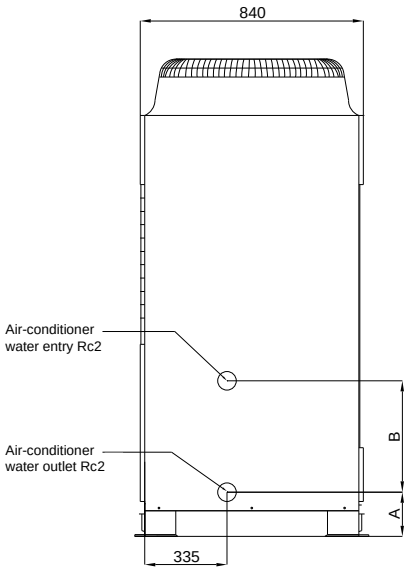
AMAC210DM5/DS5 AMAC210DRM5/DRS5

AMAC230DM5/DS5 AMAC230DRM5/DRS5





14x20 Enlarged drawing for Mounting hole of anchor bolt



Unit: mm

Model	A (mm)	B (mm)
AMAC210DM5/DS5	171	369
AMAC210DRM5/DRS5		
AMAC230DM5/DS5		
AMAC230DRM5/DRS5	165	390

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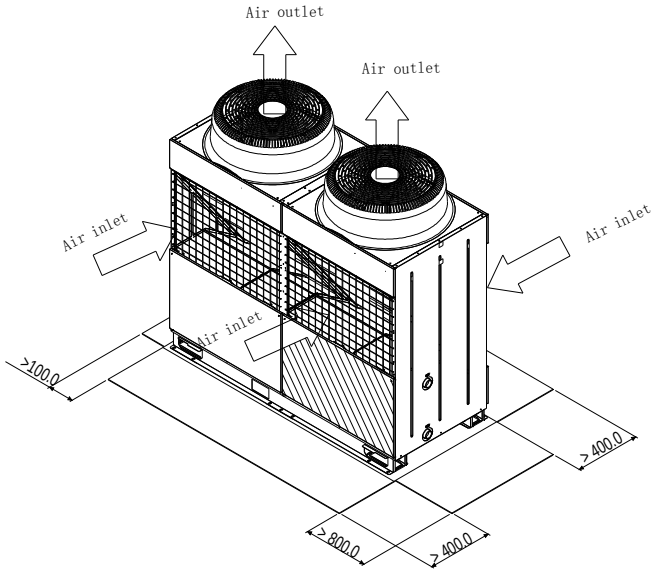
4 Installation

4.1 Machine Installation Space

Units must be installed by ACSON service staff or by specially trained personnel. Units must installed by following relevant national and local electric, building and environment protection standards as well as the installation manual.

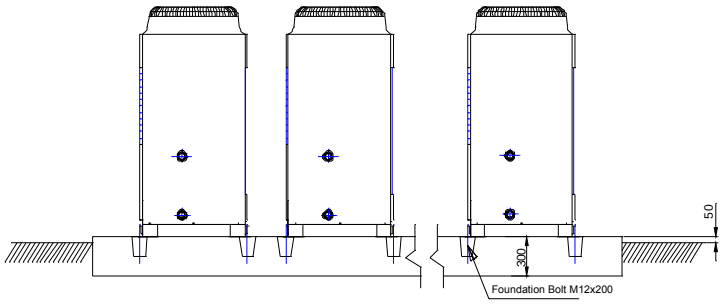
Unit: mm

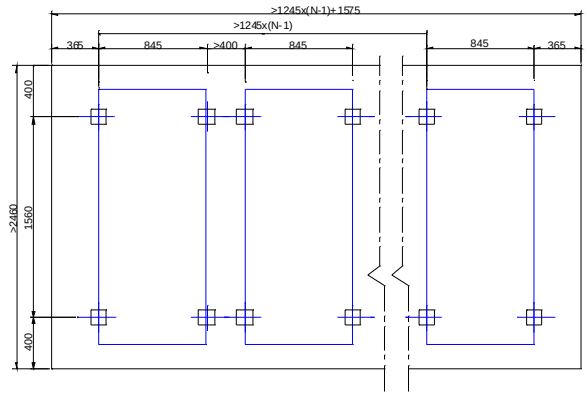


Note:

- The user manual, warranty card, accessories, and packing list are place at the right side of the unit, as illustrated by the shaded part of the figure on the left.
- Reserve sufficient maintenance space if possible.
- If the unit is installed in a place where it snows in winter, proper measures must be taken to protect the unit against snow and ensure that the unit works properly.

■ Assembling Unit Modules





Note:

- The groundwork must be a concrete floor or a V-iron structure that is strong enough to bear the operation pressure of the unit.
- N represents the number of modules installed.
- Each unit must be fixed by 4 M12 bolts;
- 6 rubber cushions of 20mm thick must be installed between the unit and the groundwork.
- The groundwork must have draining facilities to discharge condensate water and defrosting water.

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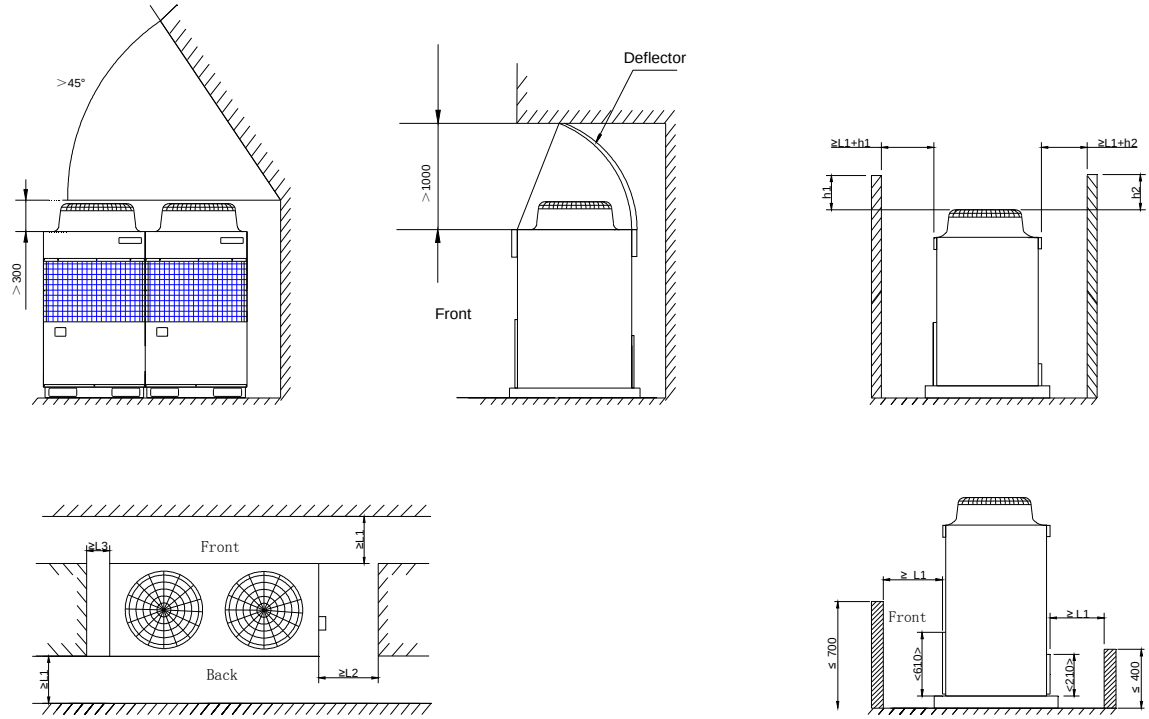
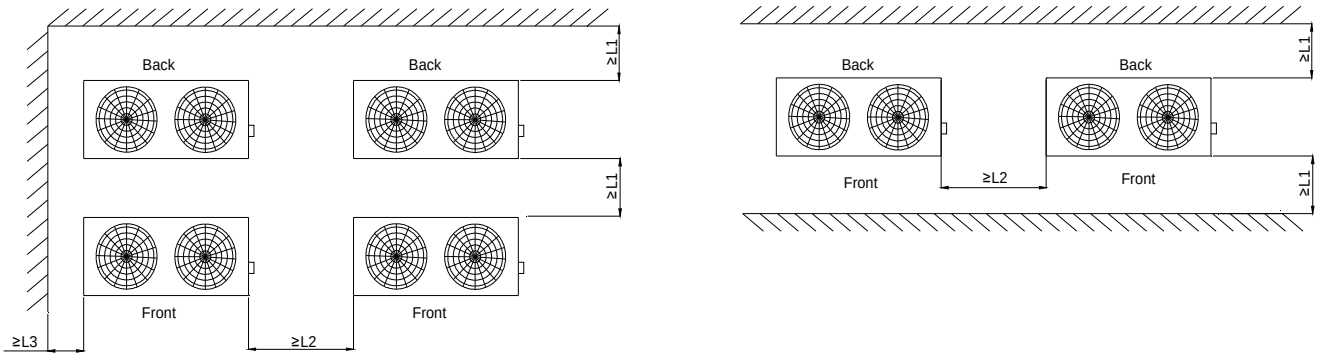
■ Space allocated for a single chilled water unit



■ Space allotted for an array of chilled water units



Unit: mm

L1	L2	L3
400	800	100

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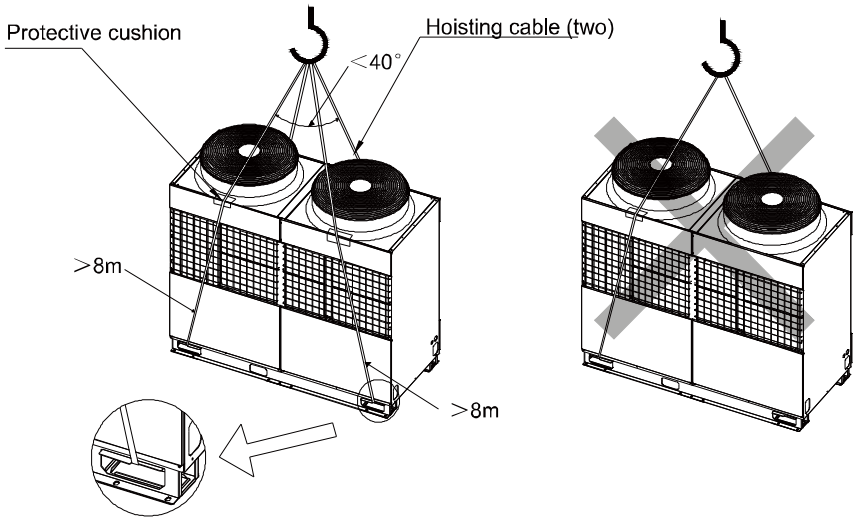
4.2 Hoisting Chillers

Please hoist the unit according to the following illustrations. Tie the cables to the four corners of the unit while moving it. If you tie the cables to only three corners of the unit, the unit might get unbalanced and fall off.

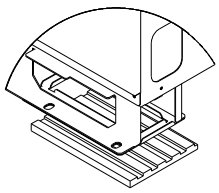


Note:

- Chilled water units must be moved with great care.
- Accessory strips cannot be used to hoist or move the unit as they might break and cause unexpected accidents.
- Do not touch the heat sinks of the heat exchanger bare-handedly as they might cut your fingers.
- Dispose all plastic bags properly and keep them away from children.

4.3 Installing Chiller

- The groundwork should be made of concrete or supporting structures. While designing the groundwork, you must fully consider the strength of the floor, water discharge (the unit discharges water while working), pipelining and wiring. If the floor is not strong enough, the unit might fall off and breakdown, even incur bodily injuries.
- Screw down the chilled water unit using anchor bolts so that it will not fall off in case of strong wind or earthquakes. To avoid damages caused by strong wind or earthquakes, The unit must be securely installed at a proper place to avoid direct hit of strong winds.



- Depending on mounting conditions, operation vibration might pass through the groundwork and generate noises in the floor and walls. Therefore, proper vibration dampening mechanisms (such as bumper cushion, bumper frame etc.) should be in place.
- Corners and edges should be properly installed. Otherwise, the unit might get unbalanced and cause the grounding pins to bend. The unit might fall off and cause bodily injuries if it is not properly installed.

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4.4 Electrical Wiring

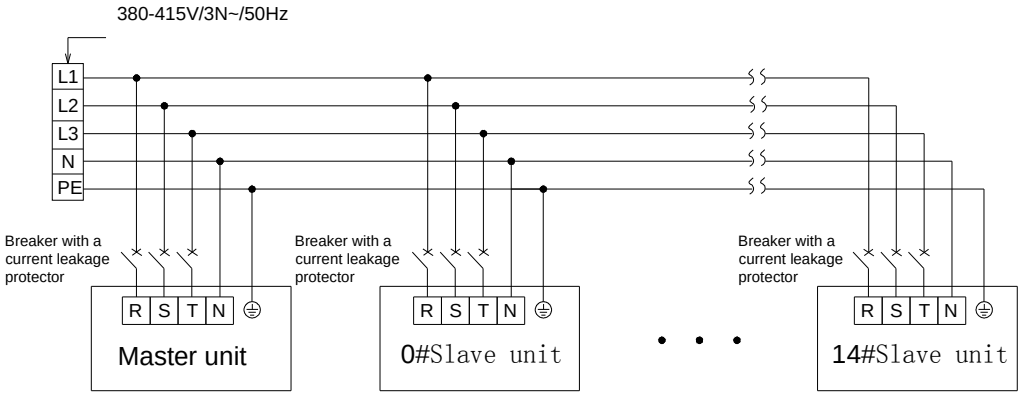
Wiring must observe the following safety rules and measures.

- Units must be installed by ACSON service staff or by specially trained personnel. Units must be installed by following relevant national and local electric, building and environment protection standards as well as the installation manual. Customers must not add or remove any controlling parts without permission. ACSON does not assume any liability for any equipment damage, bodily injury or death due to installation operations that violate these safety rules.
- Electrical wiring should be done by following the Electrical Wiring and Parameters. Each unit is supplied with a wiring diagram inside the junction box.
- The unit must be well grounded. The grounding line must not be connected to gas/water pipes or telephone lines. Improper grounding might cause electric shock accidents.
- Check that the power supply matches relevant specifications.

Model	Minimum diameter of power cord (mm²)			Max working current (A)	Max input power (kW)
	Main line (R/S/T))	Neutral line	Grounding line		
AMAC210DM5/DS5	10	6	10	44.5	24.7
AMAC210DRM5/DRS5	10	6	10	47.8	26.8
AMAC230DM5/DS5	10	6	10	47.0	26.7
AMAC230DRM5/DRS5	10	6	10	47.7	28.6

- ✧ The above electric parameters are for basic modular units.
- ✧ All wires must be securely connected.
- ✧ Wires must not contact the refrigerating pipes or moving parts of the compressor and the fan.

■ Power Cable Connection Diagram



⚠ Caution

A breaker device shall be installed at power supply incoming line, it shall have at least 3mm contact separation. The breaker device shall have short circuit and ground fault protection function. The breaker device shall be provided and installed by user.

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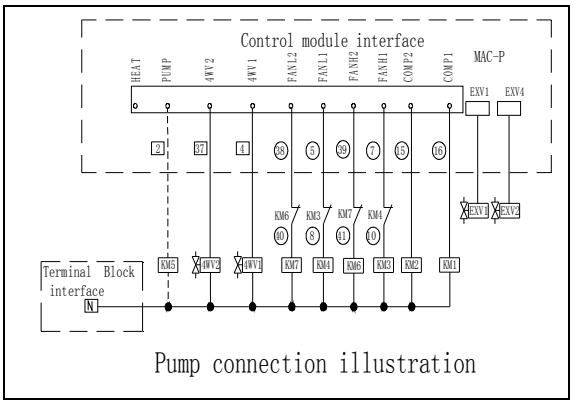
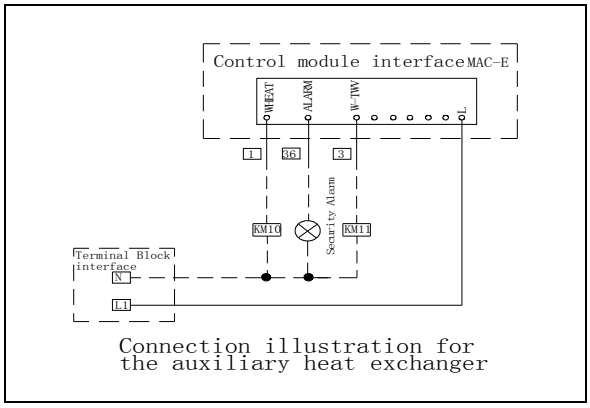
■ Connection illustration for the pump、the auxiliary heat exchanger and 2-way valve interlock of the water system





Note: -------Parts within the dashed box are to be connected onsite. The output voltage of the module interface is 220-240 V. —— Parts within the real-line box are connected before delivery.

A cooling only unit has no 4WV1 and 4WV2 output. A slave unit has no extension board MAC-E.

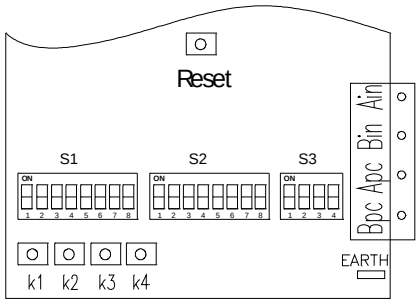
HEAT—BPHE electric heater ;**PUMP—water pump** ;4WV—4-way valve ;FANL—fan at low speed

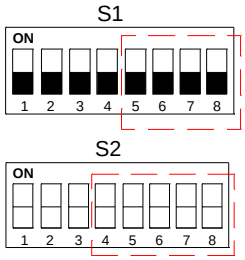
FANH—fan at high speed; COMP—compressor; EXV—Electronic expansion valve

WHEAT—auxiliary electric heater of the water system ;W-TWV—2-way valve interlock of the water system

■ Setting up Address Using DIP Switch

The controller can be used to set the 2 ways valve interlocking function, automatically start function, and set the main or slave unit address and slave unit number. The capacity DIP has been set at delivery time and cannot be changed. The address DIP and slave number DIP need to be set as needed after the unit is installed. Customers need to take down the address number and location of the unit and keep the record in good condition for maintenance reference.





Upward represents 1

Downward represents 0

■ IF 2 ways valve interlocking function is permitted , bits 1 of S1 setting on.

■ IF automatically start function is permitted , bits 3 of S1setting on.

■ Bits 1 of S2 setting. the main unit setting to on ,the slave is setting to off.

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■ A slave unit number must be set for the master unit (not for slave units) (bits 5~8 of S1):

Slave unit number	5	6	7	8	Slave unit number	5	6	7	8
0	0	0	0	0	8	1	0	0	0
1	0	0	0	1	9	1	0	0	1
2	0	0	1	0	10	1	0	1	0
3	0	0	1	1	11	1	0	1	1
4	0	1	0	0	12	1	1	0	0
5	0	1	0	1	13	1	1	0	1
6	0	1	1	0	14	1	1	1	0
7	0	1	1	1	15	1	1	1	1

■ DIP address setting (bits 4~8 of S2):

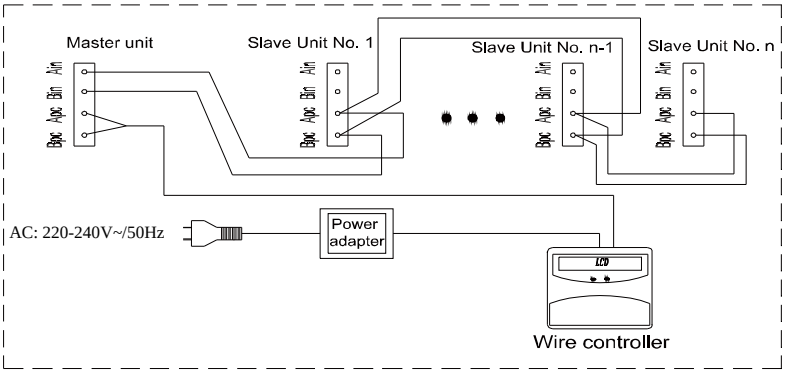
Address number	4	5	6	7	8	Address number	4	5	6	7	8
0	0	0	0	0	0	8	0	1	0	0	0
1	0	0	0	0	1	9	0	1	0	0	1
2	0	0	0	1	0	10	0	1	0	1	0
3	0	0	0	1	1	11	0	1	0	1	1
4	0	0	1	0	0	12	0	1	1	0	0
5	0	0	1	0	1	13	0	1	1	0	1
6	0	0	1	1	0	14	0	1	1	1	0
7	0	0	1	1	1	15	0	1	1	1	1

✧ The address number of the master unit must be set to 0#, and that of the slave units should follow this.

✧ Address numbers must be unique in the same system.

■ The unit can only be powered on and commissioned after the address numbers are configured.

■ Control (Communication) Wire Connection



A) conductor (WTC pair with cross section area of at least 0.5mm^2 or 20AWG); B) insulator; C) Screen layer (twisted WTC with a screening factor no less than 95%) ; D) Outer jacket (PVC);

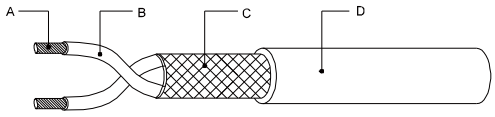


Illustration of shielded twisted pair

Note:

■ Better choose network cables with a tenser shielding layer and smaller twisting distance.

■ Please refer to the UL2547 or UL2791 wire specification.

■ The control wire must not be longer than 1000 meters.

■ The control wire must be at least 20cm away from major current wire.

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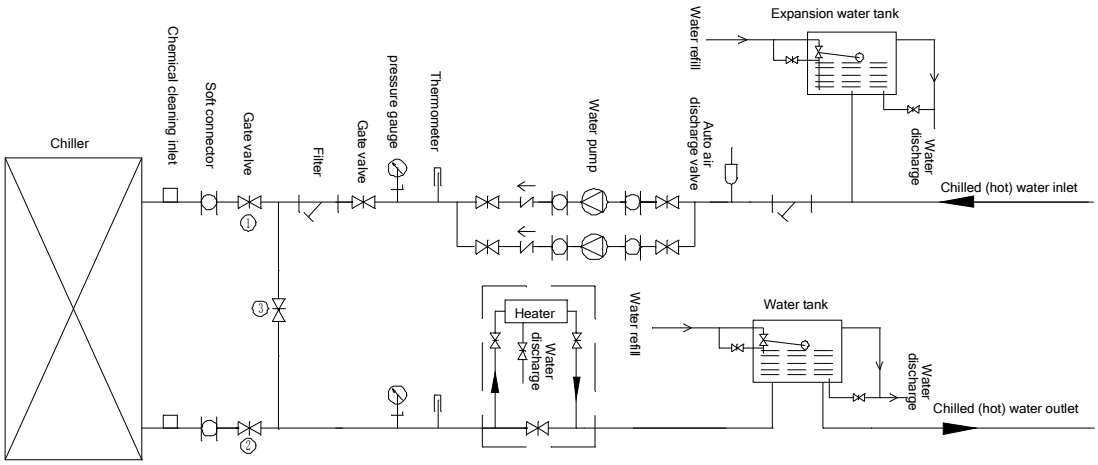
4.5 Connecting Water Pipes

- No water pump is provided as an accessory. A proper water pump must be installed to overcome resistance of the water pipes.
- Water pressure gauges and thermometers must be installed at the water inlets and outlets to facilitate the reading of unit operation status.
- The heat exchanger at the water side is made of stainless steel. Water scale may accumulate depending on the water quality and must be cleared using chemicals from time to time. Therefore, a chemical cleaning pipe connector needs to be installed at the water pipes (see the following figure).
- The water flow must be in the rated range. If the water flow is too small, scale may accumulate and degrade the performance of the unit, cause the antifreeze device to activate, or cause rust points and refrigerant leakage. If the water flow is too large, the unit may be corroded due to water impact.
- A adiabatic water tank with a proper volume is suggested to installed . If the capacity is too small, the unit might frequently restart, which causes wear and tear on the compressor.
- An expansion water tank must be installed at the return water side of the water system to adapt to water pressure variations in the water supply system caused by ambient temperature changes.
- An auto relief valve must be installed at the highest point in the water system. A suitable water discharge valve must be installed at the lowest point in the water system.
- The water pipes must be adiabatic to avoid heat loss and condensate water.
- Please follow the "Illustration for water system installation" and drawings from the design institute while installing the water system.
- Install the Y-shaped water filter inside the water inlet pipe and rinse the filter screen after commissioning.
- Before injecting water, make sure that no sand, rubble, rust, soldering tin residue or other impurities exist in the pipe, as these things might damage the heat exchanger.
  While rinsing the water system, **please bypass the unit and the terminal heat exchanger using by-pass valves.**
- Installation illustration for the water system of a single unit:



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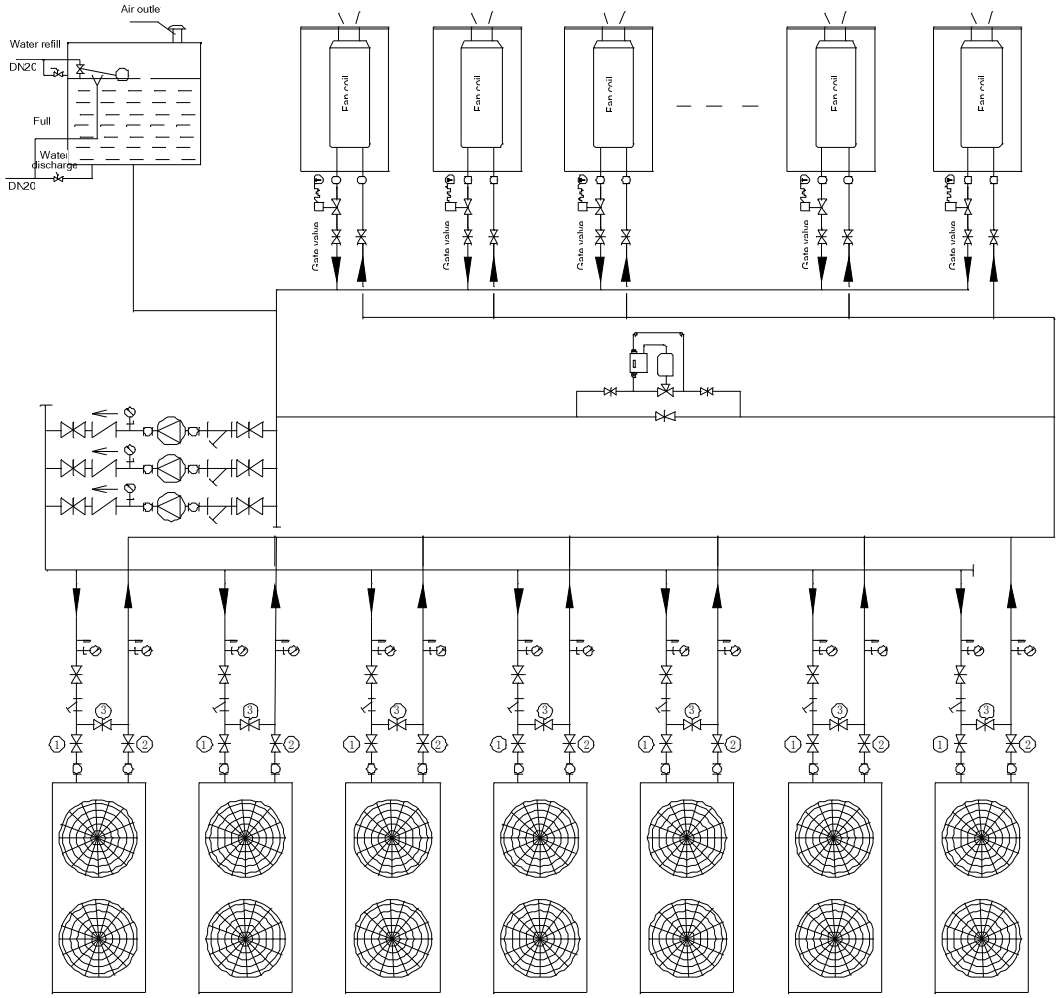
- Multi-unit combination, illustration for water system with fixed chilled water flow which adjusts indoor temperature by adjusting the terminal air rate.



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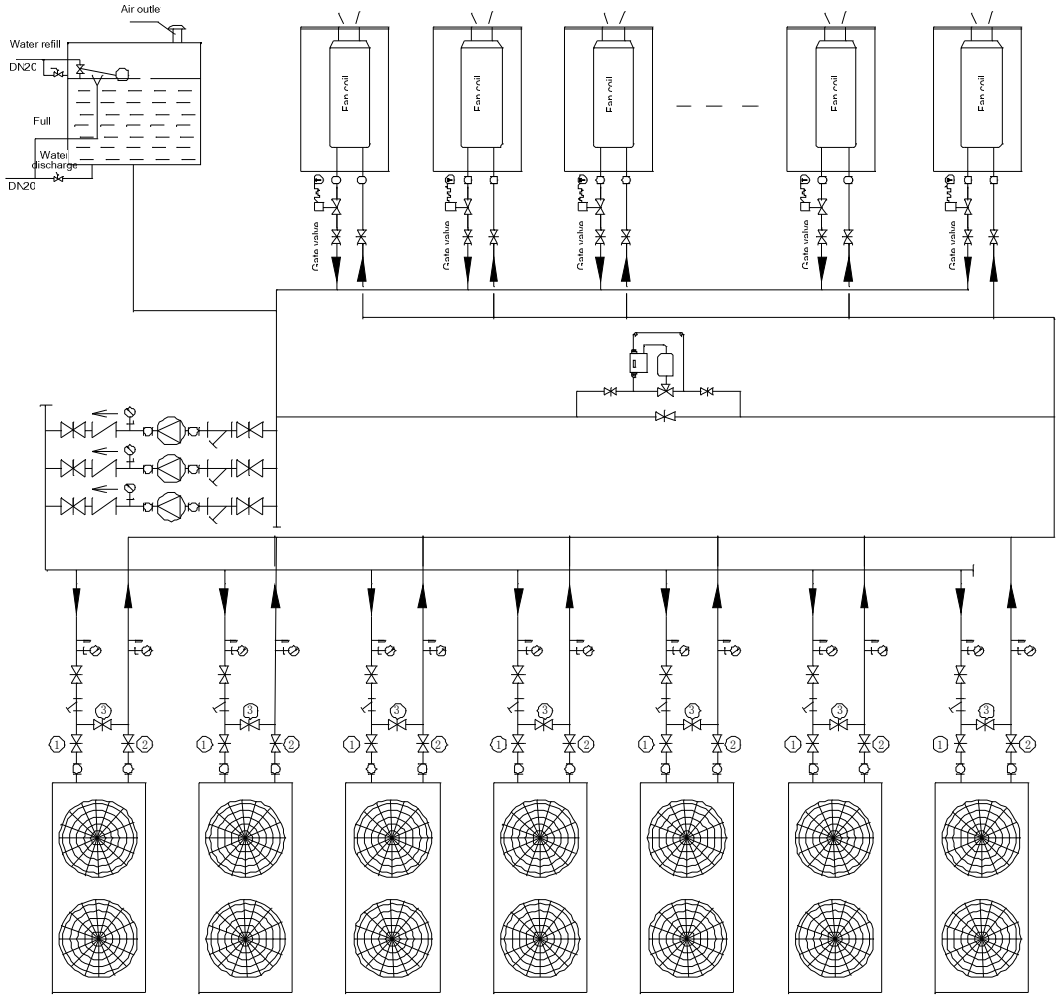
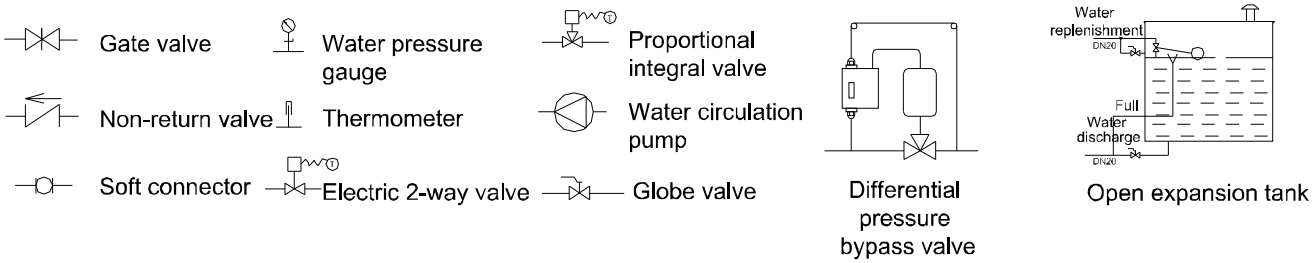
- Illustration for variable flow rate water system which adjusts indoor temperature by adjusting flow rate of chilled water (modular combination of multiple units)



Legends for the water system illustration:



Size of the main connecting pipe for modular combinations:

Unit Qty.	1	2-3	4-5	6-10
Size of main connecting pipe (inch)	≥2	≥3	≥4	≥5

Note: When cleaning the water system, please shut ①② gate valve and open ③ gate valve marked in the diagram of all the units, in order to bypass the units, so the impurities can be prevented from entering the plate heat exchanger and the efficiency and service life of plate heat exchanger can not be affected.

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4.6 Pipe Design for the Air-Conditioning System

- The pipes of an air conditioning system must have sufficient transportation capacities. For example, the water system must ensure that the water flowing through the air conditioning unit or fan coil reaches the rated flow rate to ensure that the unit works properly.
- Deploy pipes properly. Use pipes with reverse return if possible. Although the initial investment is increased a little, the water flow in the system is more stable. If pipes have no reverse return design, pressure between branch pipes must be balanced in the design process.
- When determining the diameters of pipes, ensure that the transportation capacity is sufficient, the resistance and noise is minimal, and that the unit works economically. A larger pipe diameter requires more investment, but the flow resistance is smaller, the circulation pump consumes less energy, and the operation cost is smaller. Therefore, a balance needs to be achieved between the operation cost and investment by designing the pipe diameter properly. Avoid a large water flow with small temperature variation to ensure that the pipe system is economical.
- In the design process, calculate water resistance accurately to ensure that water pressures between circuits are well balanced and that the air conditioning system works with the best water and thermal conditions.
- The pipe system of an air conditioning system must meet the adjustment requirements for partial workload.
- The pipe system of an air conditioning system should use energy saving technologies whenever possible.
- Pipes and accessories of the pipe system must meet the related requirements.
- The design of the pipe system must facilitate maintenance, operation, and adjustment.

✧ Determining the diameter of pipes in the air conditioning system

The pipe diameter is determined based on the following:

$$d = \sqrt{\frac{4m_w}{3.14\,v}}$$

In the formula: m_w-------water flow m^3/s

v---------water speed m/s

The water speed should be determined by the recommendations in the first table and design the water pipe diameters accordingly, or you can determine the water pipe diameter based on water flow in the second table.

Table 1: Recommended water speed (m/s)

Diameter (mm)	12	20	25	32	40	50	65	80
Closed water system	0.4 - 0.5	0.5 - 0.6	0.6 - 0.7	0.7 - 0.9	0.8 - 1.0	0.9 - 1.2	1.1 - 1.4	1.2 - 1.6
Open water system	0.3 - 0.4	0.4 - 0.5	0.5 - 0.6	0.6 - 0.8	0.7 - 0.9	0.9 - 1.0	0.9 - 1.2	1.1 - 1.4
Diameter (mm)	100	125	150	200	250	300	350	400
Closed water system	1.3 - 1.8	1.5 - 2.0	1.6 - 2.2	1.8 - 2.5	1.8 - 2.6	1.9 - 2.9	1.6 - 2.5	1.8 - 2.6
Open water system	1.2 - 1.6	1.4 - 1.8	1.5 - 2.0	1.6 - 2.3	1.7 - 2.4	1.7 - 2.4	1.6 - 2.1	1.8 - 2.3

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Table 2: Pipe diameter and resistance loss in unit length

Diameter of the steel tube (mm)	Closed water system		Open water system	
	Water flow (m^3/h)	kPa/100m	Water flow (m^3/h)	kPa/100m
15	0 - 0.5	0 - 60	--	--
20	0.5 - 1.0	10 - 60	--	--
25	1 - 2	10 - 60	0 - 1.3	0 - 43
32	2 - 4	10 - 60	1.3 - 2.0	11 - 40
40	4 - 6	10 - 60	2 - 4	10 - 40
50	6 - 11	10 - 60	4 - 8	--
65	11 - 18	10 - 60	8 - 14	--
80	18 - 32	10 - 60	14 - 22	--
100	32 - 65	10 - 60	22 - 45	--
125	65 - 115	10 - 60	45 - 82	10 - 40

Note: Parameters in the preceding table may vary based on the design manual. For details, see the 《HVAC Design Manual》.

4.7 Water Storage Tank Volume Calculating

Model	Setting temperature of return water (℃)	Minimum working volume Vmin. (l)
AMAC210DM5/DS5 AMAC210DRM5/DRS5	14	198
	13	234
	12	286
	11	367
	10	514
	9	857
AMAC230DM5/DS5 AMAC230DRM5/DRS5	14	224
	13	265
	12	324
	11	416
	10	583
	9	971

Note:

- The minimum working volume refers to the added-up volume of the main water pipe, water tank and constantly-open terminals of 2-way valves in the water circulation system.
- The actual working volume of the water system must be larger than Vmin; otherwise the unit will send out alarms and shut down frequently.
- If the actual resultful volume of the water system V is less than Vmin, please install a tank the volume of which is L (L=Vmin-V).

Example for water system volume calculation:

There are 2 AMAC230DR5 modular units with temperature of return water set to 12℃, a main inlet/out water pipe of DN80 and 50m long and 10 fans with coils constantly open (each has a volume of 1.5 L).

Calculation: Volume of main inlet/outlet water pipe = 3.14 x $[(80/2)/100]^2$ x 500 = 251 L

Volume of terminal fan coils = 10 * 1.5 = 15 L

According to the table above, Vmin. =324 L

To avoid frequent unit startup/shutdown and alarms, the volume of the water tank should be no less than Vmin. - V = 324 - 251 - 15 = 58 L

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4.8 Calculating volume of expansion water tank

An expansion water tank with a proper volume must be installed to adapt to water volume changes as the temperature changes and avoid freezing burst and pressure instability at the water pump inlet. The expansion water tank can also be used to supplement water and discharge air.
Calculating volume of expansion water tank.

$$Vp=\alpha*\triangle t*Vs$$

Vp----effective volume of the expansion water tank (volume of water between the signal pipe and the overflow pipe). m^3
α----volume expansion coefficient of water (α =0.0006/℃)
△t----max. water temperature variation ℃
Vs----water volume in the system (total water volume in the system and pipes) m^3

4.9 Model Selection Principles for the Water Circulation Pump

- Water flow in the water circulation pump ≥ rated water flow × 1.1
- Closed water circulation system: Water circulation pump lift ≥ (Pipe resistance of the water system + Partial resistance of the water system + Water pressure drop of the unit) × 1.1
- Open water circulation system: Water circulation pump lift ≥(Static resistance of the water system + Pipe resistance of the water system + Partial resistance of the water system + Water pressure drop of the unit) × 1.1
- In the case that multiple units share the same pump, the pump lift is calculated according to the circuit that has the maximum resistance (usually the unit that is farthest away from the pump).

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5 User Manual for Controller

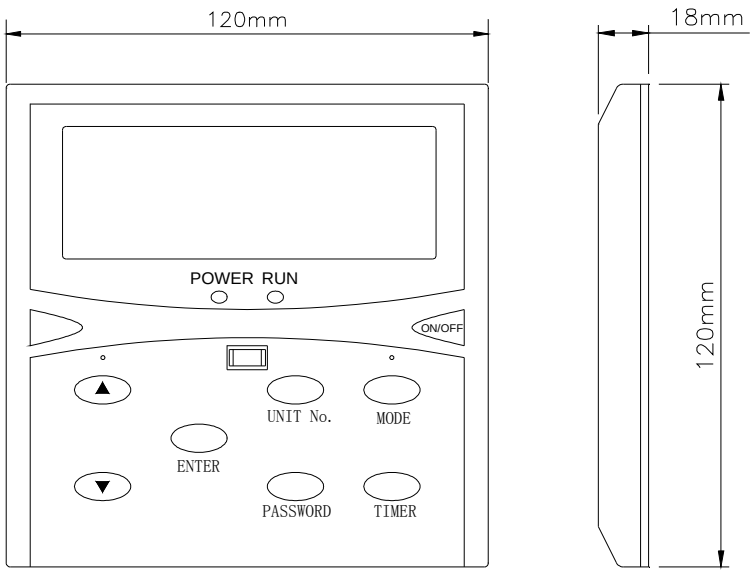
5.1 Features of the Controller

MC305 is a wall-mounted LCD controller which directly controls air conditioners through keys on its panel.

Features:

- Two operation modes: heating/cooling (note: operation modes can only be switched when the unit is off).
- Temperature setting range for inlet water: cooling 9℃ - 25℃; heating 25℃ - 50℃; Temperature setting range for inlet water: cooling 9℃ - 25℃ (-10℃ - 10℃ for units with low water temperature); heating 25℃ - 50℃.
- Temperature setting range for anti-freeze: 2℃ - 5 ℃.
- A LED is used to indicate the status of the unit (ON/OFF).
- Timed ON/OFF: a timing schedule can be set for a maximum of 7 days with up to 4 timed actions each day.
- Real-time clock.
- Error code display speeds up diagnosis.
- Blue back light will shine 8 second if any key is pressed, it makes sure that we can browse or modify parameters even in dark.

5.2 Size of the Controller



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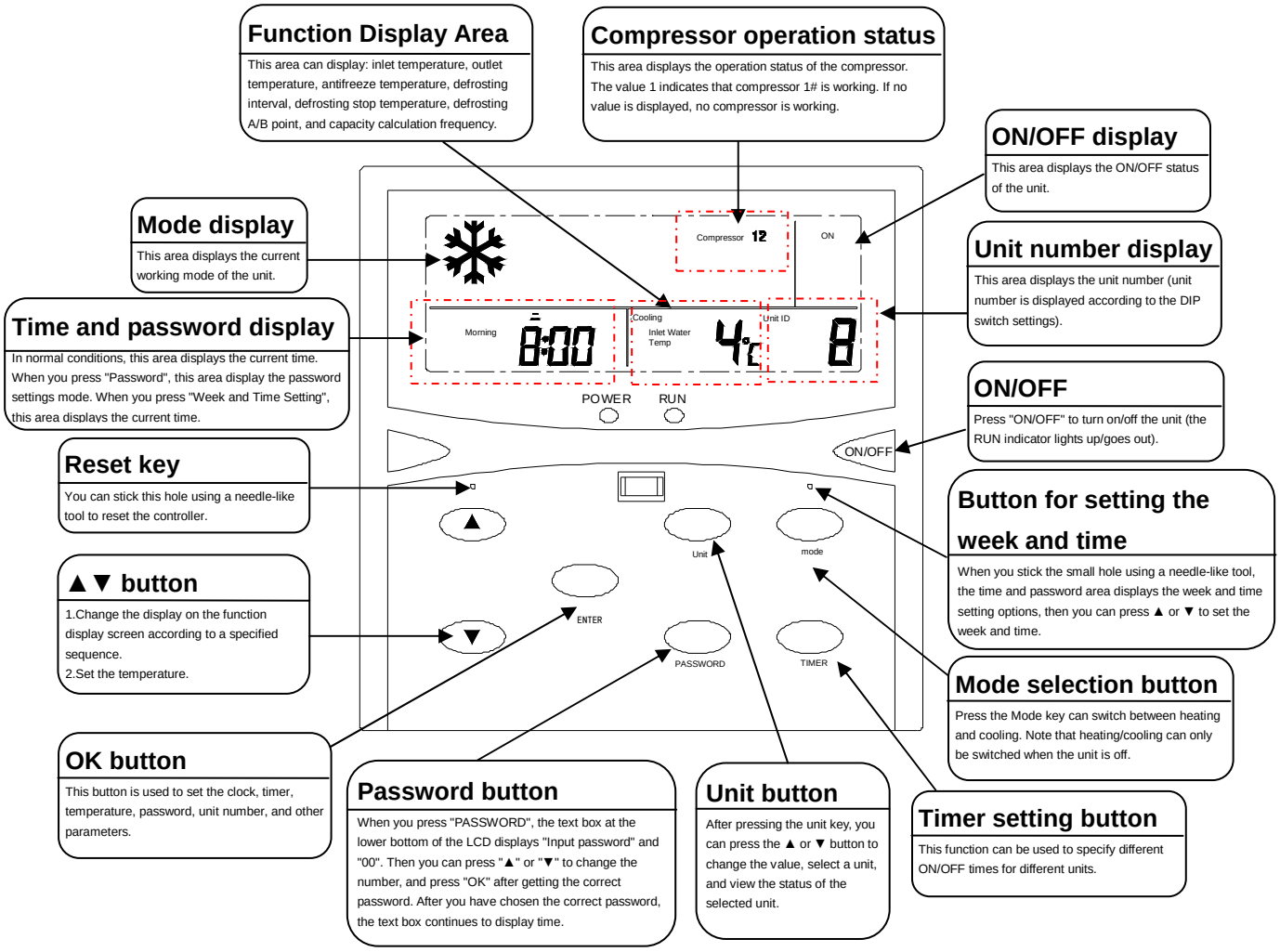
5.3 Functions of the Controller


Function Display Area
This area can display: inlet temperature, outlet temperature, antifreeze temperature, defrosting interval, defrosting stop temperature, defrosting A/B point, and capacity calculation frequency.
Compressor operation status
This area displays the operation status of the compressor. The value 1 indicates that compressor 1# is working. If no value is displayed, no compressor is working.
ON/OFF display
This area displays the ON/OFF status of the unit.
Mode display
This area displays the current working mode of the unit.
Unit number display
This area displays the unit number (unit number is displayed according to the DIP switch settings).
Time and password display
In normal conditions, this area displays the current time. When you press "Password", this area display the password settings mode. When you press "Week and Time Setting", this area displays the current time.
ON/OFF
Press "ON/OFF" to turn on/off the unit (the RUN indicator lights up/goes out).
Reset key
You can stick this hole using a needle-like tool to reset the controller.
Button for setting the week and time
When you stick the small hole using a needle-like tool, the time and password area displays the week and time setting options, then you can press ▲ or ▼ to set the week and time.
▲▼ button
1.Change the display on the function display screen according to a specified sequence.
2.Set the temperature.
Mode selection button
Press the Mode key can switch between heating and cooling. Note that heating/cooling can only be switched when the unit is off.
OK button
This button is used to set the clock, timer, temperature, password, unit number, and other parameters.
Password button
When you press "PASSWORD", the text box at the lower bottom of the LCD displays "Input password" and "00". Then you can press "▲" or "▼" to change the number, and press "OK" after getting the correct password. After you have chosen the correct password, the text box continues to display time.
Unit button
After pressing the unit key, you can press the ▲ or ▼ button to change the value, select a unit, and view the status of the selected unit.
Timer setting button
This function can be used to specify different ON/OFF times for different units.
Compressor 12
ON
Morning
8:00
Cooling
Inlet Water Temp
4°C
Unit ID
8
POWER
RUN
ON/OFF
Unit
mode
ENTER
PASSWORD
TIMER

The control system has the following functions:

S/N	Function	S/N	Function
1	Controlling the 2-way valve of the water system (relevant accessories need to be purchase separately);	11	Timing
2	Anti-freeze protection for plate heat exchanger	12	Protection for Compressors in Operation
3	Alternative defrosting	13	Averaging Workload among Compressors
4	Manual defrosting	14	Failure alarm, viewing and output
5	2-way Valve Interlock Control	15	Memorizing parameters in the case of a power failure
6	Week Setting	16	Setting and resetting the operating parameters of the unit
7	Status display	17	Electric heater
8	Auto-startup at power on	18	Setting the clock of the system
9	Setting the serial number of a unit	19	Displaying the indoor and inlet water temperatures
10	Memorizing the clock settings in the case of a power failure		

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5.4 Controller Settings

1. Parameter Viewing

The controller can be used to view the operation status and parameters of any unit connected to it.

- Parameters can be view include operation status of the compressor, inlet/outlet water temperature, timer setting, cooling antifreeze temperature setting, antifreeze temperature setting in winter, defrosting temperature, and so on.
- After pressing the "UNIT" key, you can increase/decrease the blinking unit No. and view the parameters of the current unit by pressing "▲" or "▼". To view more working parameters of a unit, you can press "OK" and "▲" or "▼" after reaching the unit No.

2. Setting Parameters (parameters can be set only when the unit is turned off)

① When you press "PASSWORD", the text box at the lower bottom of the LCD displays "Input password" and "00". Then you can press "▲" or "▼" to change the number, and press "OK" after getting the correct password (the default password set in factory is "55"). After you have chosen the correct password, the parameters to be set blinks, and you can perform the following settings:

② Change operation parameters: after choosing the correct password, you can change operation parameters by following steps ②→③→④.

③ Change password: after choosing the correct password, you can change the password by pressing "PASSWORD" again. In this case, the text box displays "00" and you can change the number by pressing "▲" or "▼". After reaching the number you want to set as the password, you can complete password setting and exit the parameter setting mode by pressing "OK".

④ After pressing the "UNIT" key, you can increase/decrease the blinking unit No. by pressing "▲" or "▼", and set operation parameters (including inlet water temperature for cooling/heating mode) for the desired unit by pressing "OK" after reaching the unit No. You can choose and set parameters by pressing "▲" or "▼" and then press "OK" to save the setting.

Repeat step ② to set other parameters (note: the controller quits the parameter setting mode if no key is pressed within 60 seconds).

3. Real time setting

To set week and time, stick the small hole above the "MODE" key using a needle-like tool (the LCD displays "Weekday Setting"); press "▲" or "▼" to choose the weekday; stick the small hole again to save weekday setting (the LCD displays "Time Setting" and the time starts to blink); press "▲" to change the hour and "▼" to change the minute; and stick the small hole again to save time setting.

4. Timer Setting

① After pressing "TIMING", the LCD displays "Week Setting" and "Timer Setting" at the same time. Then you can press "▲" or "▼" to choose the weekday and press "OK" to save the weekday setting. The LCD now displays "Timer Setting", and you can continue to set the times of timing.

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② Press "▲" or "▼" to set the number of timed actions for the day (you can set 4, as indicated above Unit No.) Select a timed action and press OK to select the action (timed ON/OFF).

③ Press "▲" or "▼" to select "Timed On" or "Timed Off" and press "OK". Now the LCD displays "Timer Setting" and "Time Setting" and the time displayed starts to blink.

④ You can press "▲" to change the hour and "▼" to change the minute" and press "OK" to save the time setting. Now the LCD displays "Timer Setting" and returns to step ③. You can continue to set other timed actions for a whole week and then quit this setting mode.

⑤ To cancel a timed action, set the time for this action to 00:00. To cancel all timed actions, press "MODE" + "UNIT" until you hear a long beeping sound.

Note: Timed ON/OFF actions are triggered when the time of the wire controller reaches the set time. Therefore, if the time of the wire controller is inaccurate, the actual ON/OFF time could also be inaccurate. In the timing process, if you do not press any key in five seconds after pressing the Unit, Mode, or Password button, the timing process is terminated and the result is not saved. The default time setting is 00:00.

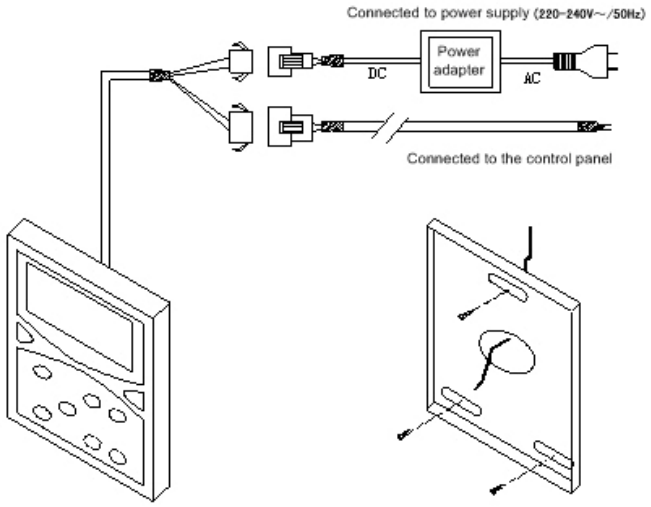
5. Manual Defrost

When the unit works in heating mode, press "▲" or "▼" until "Manual Defrosting" appears, and then press "OK" to enter Manual Defrosting mode.

6. Reset

The controller can be reset by sticking the small hole above the "▲" key using a needle-like tool.

5.5 Controller Installation



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5.6 Controller Stoppage Code

S/N	Code	Symptoms	S/N	Code	Symptoms
1	00	0#-slave communication failure	19	36	Low pressure of #2 malfunction
2	01 ~ 13	1# ~ 13# slave communication failure	20	37	Superheat of #2 is too low
3	14	14# slave communication failure	21	38	Refrigerant leakage of #1
4	16	Overload of compressor/fan of #1	22	39	Refrigerant leakage of #2
5	17	Overload of compressor/fan of #2	23	40	TH1 temperature sensor malfunction
6	18	Pump overload	24	41	TH2 temperature sensor malfunction
7	19	Water flow is too small	25	42	TH3 temperature sensor malfunction
8	20	High pressure malfunction of #1	26	43	TH4 temperature sensor malfunction
9	21	Low pressure malfunction of #1	27	45	TH6 temperature sensor malfunction
10	24	High pressure malfunction of #2	28	46	TH7 temperature sensor malfunction
11	25	Temperature of inlet/outlet water is too low	29	47	TH8 temperature sensor malfunction
12	26	Overload of electric heater in water system	30	48	TH9 temperature sensor malfunction
13	27	Ambient temperature is too high/low	31	49	TH10 temperature sensor malfunction
14	29	Superheat of #1 is too low	32	50	TH11 temperature sensor malfunction
15	32	Suction temperature of #1 is too high	33	51	TH12 temperature sensor malfunction
16	33	Discharge temperature of #1 is too high	34	52	Low pressure sensor malfunction of #2
17	34	Suction temperature of #2 is too high	35	53	Low pressure sensor malfunction of #1
18	35	Discharge temperature of #2 is too high	36	F6	Communication failure between wire controller and master unit

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6 Commissioning and Operation

6.1 Items to be confirmed before turning on unit

Note: Before the chiller run, check that the following conditions are met and read the "Safety Precautions" again.

- Ensure that the water pump and the unit are connected.
  Use the PCB controller to control the on and off the water pump using the water pump output on the PCB controller; otherwise the BPHE may burst due to freezing.
  The water pump connection point must have no voltage. If a voltage circuit is connected, basic components may be damaged.
- Power on the unit to preheat the crankcase for at least 12 hours before starting up the unit for the first time or after a long-term stoppage. This ensures that the compressor works properly.
- Before turning on the unit, check that the water pump is filled with water.
  Before turning on the water pump, open the water supply valve, fill the pump with water, and discharge free air in the system.
- Wiring of the unit: Check that the diameter of the wires meets requirements; the wires are correctly connected; the grounding line is securely connected;
- Before turning on the unit, clean the water system and ensure that pipes are clean without contaminants. For the cleaning method, see 4.5 Connecting Water Pipes
- Make sure that the working conditions do not exceed the rated working range.

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6.2 Items to be checked during the unit run

Check the following items after the unit has worked properly for a period of time:

S/N	Item	Checking Method	Reference Standard
1	Power supply voltage	Voltage	Rated voltage±10%
2	Working current of a single compressor	Current	13 - 23A
3	Working current of a single fan	Current	2 - 5A
4	Inlet water temperature in cooling operation	Temperature	15- 20℃
5	Outlet water temperature in cooling operation	Temperature	6 -15℃
6	Inlet water temperature in heating operation	Temperature	30 - 45℃
7	Inlet/outlet water temperature difference	Temperature	2 - 7℃
8	Discharge air temperature of the compressor	Temperature	65 -115℃
9	Low Pressure in cooling mode	Pressure	6.5 - 10.0bar
10	High Pressure ure in cooling mode	Pressure	22 - 41.5bar
11	Low Pressure in heating mode	Pressure	3.0 - 10.0bar
12	High Pressure in heating mode	Pressure	22 - 33bar
13	Vibration and operation noise	Listen or touch	No abnormal vibration or noise

Note: The reference standards are used to check whether a unit works properly onsite. Reference standards are determined based on the maximum and minimum working conditions. If reference standards are exceeds after the unit has properly worked for a period of time, contact the local dealer or ACSON for help.

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7 Repair and Maintenance

7.1 Repair

Note: Before checking and maintaining the unit, confirm the safety precautions again.

Note: Before delivery, strict factory test is conducted to ensure the unit works at optimal performance. The unit must be maintained from time to time.

- The unit can only be repaired and serviced by specially-trained technicians. After a unit is serviced, safety controls must be checked and analyzed before the unit is turned on.

Items to be Checked Periodically

- Clean the fin heat exchanger periodically.
  To optimize heat exchange efficiency of the condenser, check that the external part of the condenser is clean without leaves, cotton fibers, insects or other impurities which might clog up fins of the condenser. Use water or water vapor to clean while cleaning to clean it.

- Check the status of the chilled water from time to time.
  Discharge water by loosening the air or water discharge plug.
  If the water quality degrades, replace water in the system timely. (for the reference standards, see Chapter 9)
  Contaminated water can degrade the cooling capacity and corrode the heat exchanger and water pipes.

- Check whether free air exists in the water pipe system.
  Free air may get into the system even during the air discharging process. Discharge air from time to time.

- Clean the Y-shaped water filter in the water system periodically.

- Replenishing refrigerant and lubricant.
  Each unit is filled with enough refrigerant and lubricant before delivery.
  If the system operates smoothly, customers neither need nor are allowed to replenish or change the refrigerant or lubricant.
  If replenishment is necessary due to leakage, please refill the quantity specified in the nameplate of the unit.

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7.2 Maintenance

The unit must be checked on a routine basis to ensure performance. Routine check is the best way to reduce downtime and waste. The following needs to be checked on a routine basis:

Items	Monthly	Quarterly	Once half a year	Once a year	If necessary
1.Compressor					
Performance appraisal; whether there is abnormal sound	●				
Whether wires are securely connected	●				
Whether the working current is abnormal (fluctuation: 10%)		▲			
Discharge air temperature of the compressor		▲			
Check the oil level					▲
Check the color of the lubricant					▲
2.Controller					
Check parameter settings			▲		
Check protective device			▲		
Delay protector			▲		
Phase order protector			▲		
High/low pressure switch					▲
Differential water pressure switch/water flow switch					▲
Overload protector			▲		
Protector against extreme temperature of discharged air			▲		
3.Plate heat exchanger					
Check the water quality	●				
Clean the plate heat exchanger					▲
Seasonal protection measures (anti-freeze in winter)					▲
4.Fin heat exchanger					
Clean the fin heat exchanger		▲			
5.Others					
Whether the Y-shaped filter needs to be cleaned or replaced	●				
Whether bolts have loosened		●			

Note: The preceding maintenance plan is for reference only. The maintenance plan may vary based on region.

Note: ● indicates items to be checked by customers; ▲ indicates items to be checked by service personnel.

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8 Stoppage and Handling

8.1 Stoppage Code and Running Status

■ **Characters displayed by the LED indicator are explained in the following table**

Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning	Character	Meaning
0	0/O	2	2	4	4	6	6	8	8	A	A	C	C	E	E	H	H	n	N	r	R	U	U
1	1	3	3	5	5	7	7	9	9	b	B	d	D	F	F	L	L	P	P	t	T	y	Y

■ **Codes representing normal operation statuses are explained in the following table**

Code	Status	Code	Status	Code	Status
NULL	NULL: standby	CSP	CSP: shutdown during cooling	HEAt	HEAT: heating
rESt	REST: reset	dEF	DEF: defrosting	HSP	HSP: shutdown during heating
COOL	COOL: cooling				

■ **Codes displayed by the LED indicator and explanations**

Error code	Description	Error code	Description	Error code	Description
ECXX	XX# slave communication failure	ER30	Reserved	ER45	TH6 temperature sensor malfunction
ER16	Overload of compressor/fan in #1	ER31	Slave-master communication failure	ER46	TH7 temperature sensor malfunction
ER17	Overload of compressor/fan in #2	ER32	suction temperature #1 is too high	ER47	TH8 temperature sensor malfunction
ER18	Pump overload	ER33	discharge temperature #1 is too high	ER48	TH9 temperature sensor malfunction
ER19	Water flow is too small	ER34	suction temperature #2 is too high	ER49	TH10 temperature sensor malfunction
ER20	High pressure malfunction of #1	ER35	discharge temperature #2 is too high	ER50	TH11 temperature sensor malfunction
ER21	Low pressure malfunction of #1	ER36	Low pressure malfunction of #2	ER51	TH12 temperature sensor malfunction
ER22	Reserved	ER37	Superheat of #2 is too low	ER52	Low pressure sensor malfunction of #2
ER23	Reserved	ER38	Refrigerant leakage in #1	ER53	Low pressure sensor malfunction of #1
ER24	High pressure malfunction of #2	ER39	Refrigerant leakage in #2	EC78	Communication failure for all slave units
ER25	Temperature of inlet/ outlet water is too low	ER40	TH1 temperature sensor malfunction		
ER26	Overload of electric heater in water system	ER41	TH2 temperature sensor malfunction		
ER27	Ambient temperature is too high/low	ER42	TH3 temperature sensor malfunction		
ER28	Reserved	ER43	TH4 temperature sensor malfunction		
ER29	Superheat of #1 is too low	ER44	Reserved		

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8.2 Cause for failure and troubleshooting

S/N	Error code	Description	Possible causes for the failure	Solution
1	Wire controller F6 alarm	Communication failure between wire controller and master unit	1. A/B communication lines of the wire controller and master unit are incorrectly connected.	Check and troubleshoot the communication lines.
			2. The communication line has broken off.	
			3. Communication wires between the wire controller and the master unit cross over strong-current cables.	Rewire the unit, use shielded communication lines or keep the communication lines away from strong current cables.
			4. Control panel of the master unit is not powered on.	Check and troubleshoot the control panel
			5. The communication line between the master unit and the wire controller is too long.	1、Use shield lines 2、Short the JP7 jumper on the control panel
			6. Can communicate with the monitoring software while the wire controller sends out the alarm F6	Remove the R44 resistor on the wire controller or replace the wire controller
			7. Failure of communication ports on the control panel of the master unit	Replace
			8. Failure of communication ports on the wire controller	Replace
			9. Incorrect address setting for the master unit	Reset the S2 DIP switch of the master unit according to the technical specifications.
2	The LED indicator of the unit displays ECXX and the wire controller displays XX (XX represents 00 ~ 14)	Communication failure of Slave Unit No. XX	1. Communication line of Slave Unit No. XX has broken off	Check and troubleshoot the communication lines.
			2. The control panel of Slave Unit No. XX is not powered on.	Check and troubleshoot the control panel
			3. Incorrect DIP address setting for the slave unit	Reset the addresses of all slave units and check that there is no duplicate address
			4. The number of slave unit is set incorrectly for the master unit.	Reset the number of slave units and check that the number match with all the addresses
			5. The PC communication port of the slave unit has broken down	1. Exchange positions of the two 485 on Slave Unit No. XX
				2. Replace the control panel
			6. The communication line of Slave Unit No. XX is incorrectly connected.	Connect the communication line of Slave Unit No. XX to Apc/Bpc port
3	The LED indicator of the unit displays EC78	Communication failure for all slave units	1. The Bin/Ain communication line of the master unit has broken off	Reconnect the communication line to the Bin/Ain port and screw down the wire terminal
			2. One of the A/B communication lines is connected incorrectly	Check the communication line
			3. The Bin/Ain port of the master unit has broken down	Replace the control panel of the master unit
4	The LED indicator of the unit displays ER16 and the wire controller displays 16	Compressor overload in #1	Over current in the compressor has triggered the overload protector.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit. 2. Check whether the resistor of the malfunctioned compressor meets specification requirements.

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S/N	Error code	Description	Possible causes for the failure	Solution
4		Fan overload in #1	Over current in the fan has triggered the overload protector.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit. 2. Check whether the resistor of the malfunctioned fan meets specification requirements.
5	The LED indicator of the unit displays ER17 and the wire controller displays 17	Compressor overload in #2	Over current in the compressor has triggered the overload protector.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit. 2. Check whether the resistor of the malfunctioned compressor meets specification requirements.
		Fan overload in #2	Over current in the fan has triggered the overload protector.	1. Check whether the electric current parameter of the overload protector is configured correctly by referring to the electric circuit. 2. Check whether the resistor of the malfunctioned fan meets specification requirements.
6	The LED indicator of the unit displays ER18 and the wire controller displays 18	Pump overload	Over current in the pump has triggered the overload protector.	1. Check whether the electric current parameter of the overload protector is configured correctly for the pump by referring to the electric circuit. 2. Check whether the resistor of the malfunctioned pump meets specification requirements.
7	The LED indicator of the unit displays ER19 and the wire controller displays 19	Alarm from the differential water pressure switch	1. The pump model is too small	Replace the pump
			2. The water filter is clogged up	Clean the water filter
			3. Air in the water system is not completely discharged	Turn on the pump to further discharge residual air
			4. The differential water pressure switch is clogged up	Repair or replace the differential water pressure switch
			5. The differential water pressure switch has broken down	Replace the differential water pressure switch
			6. Pressure drop in the water system is too sharp and unbalanced	Optimize the water system
			7. Other parts in the water system are clogged up	Check and repair
8	The LED indicator of the unit displays ER20 and the wire controller displays 20	Low pressure of #1	1. The motor has broken down (cooling)	Check and troubleshoot
			2. Circulatory air is shorted (cooling)	
			3. The heat exchanger needs cleaning (cooling)	
			4. The fluorine-side filter is clogged up	Check and replace
			5. The water temperature is too high (heating)	Tune down the water temperature
			6. The water flow is too small (heating)	Check and troubleshoot
			7. The water filter is clogged up (heating)	Clean the water filter
			8. The ambient temperature is too high (cooling)	OFF
			9. Too much refrigerant	Release a proper amount of refrigerant
			10. Failure of high-voltage modular output port	Replace the module
			11. The switch has broken down	Replace pressure switch

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S/N	Error code	Description	Possible causes for the failure	Solution
9	The LED indicator of the unit displays ER21 and the wire controller displays 21	Low pressure of #1	1. Malfunction of heat exchanger during heating	Check and troubleshoot the outdoor unit
			2. Malfunction of motor during heating	Check and troubleshoot the outdoor motor
			3. Insufficient refrigerant or leakage	Check and replenish refrigerant
			4. Failure of low-voltage modular input port	Replace the module
			5. The low pressure sensor has broken down	Replace the pressure sensor
10	The LED indicator of the unit displays ER24 and the wire controller displays 24	High pressure of #2	1. The motor has broken down (cooling)	Check and troubleshoot
			2. Circulatory air is shorted (cooling)	
			3. The heat exchanger needs cleaning (cooling)	
			4. The fluorine-side filter is clogged up	Check and replace
			5. The water temperature is too high (heating)	Tune down the water temperature
			6. The water flow is too small (heating)	Check and troubleshoot
			7. The water filter is clogged up (heating)	Clean the water filter
			8. The ambient temperature is too high (cooling)	OFF
			9. Too much refrigerant	Release a proper amount of refrigerant
			10. Failure of high-voltage modular output port	Replace the module
			11. The switch has broken down	Replace pressure switch
11	The LED indicator of the unit displays ER25 and the wire controller displays 25	Temperature of inlet/outlet water is too low	1. The temperature of return water is set too low	Change the temperature setting for return water
			2. The water flow is too small, resulting in a large pressure drop	Check the water system (see Item 7 in the table)
12	The LED indicator of the unit displays ER26 and the wire controller displays 26	Overload of electric heater in water system	1. Check whether the water system is equipped with an electric heater	Short the overload switch for the electric heater if there is no electric heater in the water system
			2. The heating wire of the electric heater in the water system is shorted	Replace the electric heater of the water system
13	The LED indicator of the unit displays ER27 and the wire controller displays 27	Ambient temperature is too high/low	1. The ambient temperature sensor has broken down	Replace the ambient temperature sensor
			2. The ambient temperature is too high/low	OFF
14	The LED indicator of the unit displays ER29 and the wire controller displays 29	Superheat of #1 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. The electronic expansion valve fails to provide proper control	Upgrade the modular program
15	The LED indicator of the unit displays ER31	Communication failure between the master unit and slave units	1. Communication line of the slave unit has broken off	Check and troubleshoot the communication lines.
			2. Incorrect DIP address setting for the slave unit	Reset the addresses of all slave units and check that there is no duplicate address
			3. The number of slave unit is set incorrectly for the master unit	Reset the number of slave units and check that the number match with all the addresses

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S/N	Error code	Description	Possible causes for the failure	Solution
15	The LED indicator of the unit displays ER31	Communication failure between the master unit and slave units	4. The PC communication port of the slave unit has broken down	1. Exchange positions of the two 485 on the slave unit
				2. Replace the control panel of the unit
			5. The communication line of the slave unit is incorrectly connected	Connect the communication line of the slave unit to the Apc/Bpc port
16	The LED indicator of the unit displays ER32 and the wire controller displays 32	Temperature of return air in #1 is too high (40℃)	1. The slider of the 4-way valve is jammed in the middle	Restart the unit and slap slightly on both sides of the 4-way valve. If the problem persists, replace the 4-way valve.
			2. The winding of the 4-way valve operates abnormally	Replace the winding
			3. The temperature of discharge air is too high and has triggered the racing protector of the compressor	(see Item 17 in the table)
17	The LED indicator of the unit displays ER33 and the wire controller displays 33	Temperature of discharge air in #1 is too high	1. The fan motor has broken down (cooling)	Check and troubleshoot the unit
			2. Circulatory air is shorted (cooling)	
			3. The heat exchanger needs cleaning (cooling)	
			4. The electronic expansion valve is not opened as expected (heating)	Check and troubleshoot the electronic expansion valve
			5. The water temperature is too high	Change the setting for return water temperature (to be performed by service personnel)
			6. Insufficient refrigerant or leakage	Replenish a proper amount of refrigerant
			1、 Incomplete defrosting	Change the defrosting parameter (to be performed by service personnel)
18	The LED indicator of the unit displays ER34 and the wire controller displays 34	Temperature of return air in #2 is too high (40℃)	1. The slider of the 4-way valve is jammed in the middle	Restart the unit and slap slightly on both sides of the 4-way valve. If the problem persists, replace the 4-way valve.
			2. The winding of the 4-way valve operates abnormally	Replace the winding
			3. The temperature of discharge air is too high and has triggered the racing protector of the compressor	(see Item 19 in the table)
19	The LED indicator of the unit displays ER35 and the wire controller displays 35	Temperature of discharge air in #2 is too high	1. The fan motor has broken down (cooling)	Check and troubleshoot the unit
			2. Circulatory air is shorted (cooling)	
			3. The heat exchanger needs cleaning (cooling)	
			4. The electronic expansion valve is not opened as expected (heating)	Check and troubleshoot the electronic expansion valve
			5. The water temperature is too high	Change the setting for return water temperature (to be performed by service personnel)
			6. Insufficient refrigerant or leakage	Replenish a proper amount of refrigerant
			7. Incomplete defrosting	Change the defrosting parameter (to be performed by service personnel)
20	The LED indicator of the unit displays ER36 and the wire controller displays 36	Low pressure of #2	1. Malfunction of heat exchanger during heating	Check and troubleshoot the outdoor unit

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S/N	Error code	Description	Possible causes for the failure	Solution
20	The LED indicator of the unit displays ER36 and the wire controller displays 36	Low pressure of #2	2. Malfunction of motor during heating	Check and troubleshoot the outdoor motor
			3. Insufficient refrigerant or leakage	Check and replenish refrigerant
			4. Failure of low-voltage modular input port	Replace the module
			5. The low pressure sensor has broken down	Replace the pressure sensor
21	The LED indicator of the unit displays ER37 and the wire controller displays 37	Superheat of #2 is too low	1. The low pressure sensor or temperature sensor has broken down	Replace
			2. The electronic expansion valve fails to provide proper control	Upgrade the modular program
22	The LED indicator of the unit displays ER38 and the wire controller displays 38	Refrigerant leakage in #1	1. Low pressure sensor failure	Replace the low pressure sensor
			2. Insufficient refrigerant	Add refrigerant
23	The LED indicator of the unit displays ER39 and the wire controller displays 39	Refrigerant leakage in #2	1. Low pressure sensor failure	Replace the low pressure sensor
			2. Insufficient refrigerant	Add refrigerant
24	The LED indicator of the unit displays ER40	TH1 temperature sensor failure	1. TH1 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH1 temperature sensor is shorted/open	Test whether the resistance of TH1 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
25	The LED indicator of the unit displays ER41	TH2 temperature sensor failure	1. TH2 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH2 temperature sensor is shorted/open	Test whether the resistance of TH2 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
26	The LED indicator of the unit displays ER42	TH3 temperature sensor failure	1. TH3 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH3 temperature sensor is shorted/open	Test whether the resistance of TH3 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
27	The LED indicator of the unit displays ER43	TH4 temperature sensor failure	1. TH4 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH4 temperature sensor is shorted/open	Test whether the resistance of TH4 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module

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S/N	Error code	Description	Possible causes for the failure	Solution
28	The LED indicator of the unit displays ER45	TH6 temperature sensor failure	1. TH6 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH6 temperature sensor is shorted/open	Test whether the resistance of TH6 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
29	The LED indicator of the unit displays ER46	TH7 temperature sensor failure	1. TH7 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH7 temperature sensor is shorted/open	Test whether the resistance of TH7 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
30	The LED indicator of the unit displays ER47	TH8 temperature sensor failure	1. TH8 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH8 temperature sensor is shorted/open	Test whether the resistance of TH8 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
31	The LED indicator of the unit displays ER48	TH9 temperature sensor failure	1. TH9 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH9 temperature sensor is shorted/open	Test whether the resistance of TH9 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
32	The LED indicator of the unit displays ER49	TH10 temperature sensor failure	1. TH10 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH10 temperature sensor is shorted/open	Test whether the resistance of TH10 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
33	The LED indicator of the unit displays ER50	TH11 temperature sensor failure	1. TH11 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH11 temperature sensor is shorted/open	Test whether the resistance of TH11 sensor meets specification requirements/replace if not
			3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
34	The LED indicator of the unit displays ER51	TH12 temperature sensor failure	1. TH12 temperature sensor is not properly plugged or has broken off	Check the control module and re-plug the temperature sensor
			2. TH12 temperature sensor is shorted/open	Test whether the resistance of TH12 sensor meets specification requirements/replace if not

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S/N	Error code	Description	Possible causes for the failure	Solution
34	The LED indicator of the unit displays ER51	TH12 temperature sensor failure	3. There is something wrong with the test circuit of the temperature sensor in the control module	Replace the control module
35	The LED indicator of the unit displays ER52	Low pressure sensor failure of #2	1. Three lines of the low pressure sensor is incorrectly connected	Reconnect the connecting lines of the low pressure sensor
			2. The low pressure sensor is shorted/open	Repair or replace the lines of the low pressure sensor
			3. The Low pressure sensor has broken down	Replace the low pressure sensor
			4. There is something wrong with the test circuit of the low pressure sensor in the control module	Replace the control module
36	The LED indicator of the unit displays ER53	Low pressure sensor failure of #1	1. Three lines of the low pressure sensor is incorrectly connected	Reconnect the connecting lines of the low pressure sensor
			2. The low pressure sensor is shorted/open	Repair or replace the lines of the low pressure sensor
			3. The Low pressure sensor has broken down	Replace the low pressure sensor
			4. There is something wrong with the test circuit of the low pressure sensor in the control module	Replace the control module

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9 Water Quality Management

9.1 Water Quality Requirements

Water in the water system must be softened to prevent scale in the heat exchanger and affecting the heat exchanger performance. Water not softened can also cause scale in the water pipes and cause the water resistance to increase. This affects the water flow and the performance of the water pump. Softened water must meet the following requirements.

Item			Benchmark value	Tendencies	
				Corrosion	Scaling
Benchmark items	pH (25℃)		7.0 - 9.0	○	○
	Conductivity (25℃)	μS/cm	< 800	○	○
	Cl^-	mg (Cl^-)/L	< 200	○	
	SO_4^{2-}	mg (SO_4^{2-})/L	< 200	○	
	Acid consumption (pH = 4.8)	mg ($CaCO_3$)/L	< 100		○
	Total hardness	mg ($CaCO_3$)/L	< 200		○
Reference items	Fe	mg (Fe)/L	< 1.0	○	○
	S^{2-}	mg (S^{2-})/L	0	○	
	NH^+	mg (NH^+)/L	< 1.0	○	
	SiO_2	mg (SiO_2)/L	< 50		○
Note: ○ represents factors that may cause corrosion or scaling.					

Water from the water system is tap water that must meet the local sanitation regulations.

9.2 Water Processing Method

To ensure effective operation and durability, cleaning, washing and chemical processing are very important for water systems. Different types of water circuits need to be cleaned in different ways.

■ Close Re-Circulation System

Water systems of this type generally require no adjustment to subdue scale, and require no chemical to suppress mud and alga. This type of water system is recommended. Closed recycle systems may need anti-corrosion measures, including the following (for reference only):

a、 $NaNO_2$, borate and inhibitors for organic materials

b、 $NaNO_2$, borate and silicate

c、 High density chromate solution and pH control

d、 pH and sulfite control

e、 Polyphosphate salt and silicate

f、 Alkali, phosphate and sulfite control

Because it is hard to control water quality, for closed recycle systems, we recommend that the total density of copper pipe inhibitors such as $NaNO_2$, borax, silicate and benzothiazole should be no less than 1400 ppm. The inhibitor $NaNO_2$ is soluble in glycol, and can be used in northern areas or in the subsystem of solar power systems.

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■ Open Re-circulation System

This type of water system is generally not recommended. They are exposed to the atmosphere, and are susceptible to scale, corrosion, mud and alga. Therefore, they might degrade the performance and reduce the service life of the unit.

■ Once-through System

Generally, once-through systems are only used for cooling only air conditioners. Water systems of this type use water from taps, lakes, rivers, and wells. Although the once-through system exchanges heat with the closed water circuit, it is not considered as an integral part of the water source heat pump system. Once-through systems may be troubled by either scale or corrosion. This type of water system requires large amount of adjustment water. Therefore, you need to consider the scale coefficient, the equipment used for cleaning work, and necessary anti-corrosion materials.

⚠ Caution

Water from lakes and rivers may cause problems such as mud and alga!

Comparison among closed recycle systems, open recycle systems and once-through systems

	Once-through System	Open Recycle System	Closed Recycle System
Scale control	1. Surface activator such as polyphosphate salt 2. Increased acidity 3. pH adjustment 4. Other considerations include: surface temperature, water temperature and system cleaning	1. Discharge 2. Surface activator such as polyphosphate salt 3. Increased acidity 4. pH adjustment 5. Softening (other considerations include: surface temperature, water temperature and system cleaning).	No control is necessary
Corrosion control	1. Low density corrosion inhibitor 2. Anti-CaCO2 plate 3. pH control 4. Proper material	1. High density (200 - 500 ppm) corrosion inhibitor 2. Low density (20 - 30 ppm) corrosion inhibitor 3. pH control 4. Proper material	1. High density corrosion inhibitor 2. Proper material
Mud and alga control	1. Chloridized hydroxybenzene 2. Other chemicals 3. Chlorine formed by hypochlorite and liquid chlorine	1. Chloridized hydroxybenzene 2. Other chemicals 3. Chlorine formed by hypochlorite and liquid chlorine	No control is necessary

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10 Notice to Users

1. Rights and Obligations

The Installation and in-warranty service can only be performed by the service personnel of ACSON or by experienced technicians. ACSON does not assume any liability for any property damage, bodily injury or death due to operations that violate this rule.

2. Check and Acceptance

While accepting the unit, please check whether any part is damaged or missing during transportation. If any part is damaged or missing, please immediately inform the dealer by a written notice.

3. Maintenance Considerations

- Wash the water system periodically.
- When the temperature drops below 0℃ in winter, proper antifreeze measures should be taken.
- Do not pile up anything near the air inlet and outlet; otherwise the air conditioner might stop working or be less effective.
- Most importantly, external pumps must be able to communicate with the unit; otherwise the plate heat exchanger might freeze up if the water supplied is insufficient.

4. Safety Considerations

Please read the following considerations carefully so that you can correctly use the air conditioner.
Pay special attention to the following safety considerations.
Keep this user manual at hand for future reference.
If the air conditioner is transferred to another user, this user manual should also be rendered to the new user.

- If anything abnormal takes place (such as a roast smell), please immediately cut off the power supply and contact the dealer for help.
- The unit should be installed by the dealer.
- Improper installation might incur water/electric leakage or fire.
- Please contact the dealer for help if you need to remove or reinstall the unit.
- Turn on/off the unit by using the controller.
- Do not turn on/off the unit by plug/unplug the power supply, as the startup current might be too large and burn the socket, causing short circuit or bodily injury.
- The power supply should be securely connected and the power cable well insulated.
- Wires that are loose or impaired might incur electric shock, short circuit or fire.

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- Do not put your fingers, sticks or other unwanted things into the air outlet of the unit; otherwise the unit might be damaged, even resulting in bodily injuries.
- Air conditioned rooms should be regularly ventilated; otherwise there might not be enough oxygen.
- Do not spray combustible materials (such as pesticide, paint etc.) which might incur fire onto the unit.
- Do not stand on or pile up anything on the unit.
- Do not touch the unit with wet hand; otherwise you might get electric shock.
- Use fuse of the correct specification. The fuse cannot be replaced by wires or other conductors; otherwise the unit might break down or cause fire.
- The unit must be turned off and disconnected from the power supply before any servicing or repairing work to avoid the risk of electric shock and bodily injuries.
- The unit must be well earthed grounded. The grounding line must not be connected to gas/water pipes or telephone lines. Improper grounding might cause electric shock accidents.
- Install an anti-leakage device to prevent electric leakage from causing bodily injuries.

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11 After sales Services & Warranty

1. After sales Services

— Maintenance and repair must be done by the dealer. Improper maintenance and repair might incur water leakage, electric shock or fire.
— Moving or reinstalling the unit must be done by the dealer. Improper installation might incur water leakage, electric shock or fire.

Please provide the following information while asking for service:
Unit model (see the Warranty Card)
License number and installation date (see the Warranty Card).
Detailed symptoms
Your name, address and phone number

Post-warranty Repair
Ask the dealer for help. If the unit is repairable, we provide charged services.

Maintenance
After several service seasons, the performance of the unit will lower down if dust accumulates inside it.
In addition to daily service and maintenance work done by yourself, we recommend you to sign a maintenance contract with the dealer.
Please ask the dealer for detailed information about this service.

Consultancy
Ask the dealer for detailed information about after-sales services.

2. Warranty Period

— A warranty card is attached to the product.
After filling in necessary information, the seller will entrust you with the Repair Application Table. Check that information in the Repair Application Table is correct, and then keep it in good condition.
— Warranty Period
The guaranteed period lasts one year since the product is purchased. See Repair Application Table for more details.
ACSON provides free repair services in the warranty period if customers inform the dealer and produce the warranty card.
Services might be charged even during the warranty period if customers fail to inform the dealer and produce the warranty card.

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12 Maintenance (Repair) Record

- Failure description and troubleshooting measures should be described as detailed and clear as possible.
- For troubleshooting methods, see Chapter 8 Stoppage and Handling.
- If an unknown failure occurs, shut down the unit immediately, cut off the power supply, and contact the local dealer for help.
- Keep this record page in good condition.

S/N	Symptoms	Troubleshooting	Result	Recorder
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

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We have tried our utmost to ensure the accuracy of all the details contained in each manual. As we are always committed to technological improvement, the units and specifications are subject to change without further notice. Please refer to the nameplate. In addition, to meet local criteria and customer requirements, we may modify the units and specifications. Please also take notice that not all the models suit every market.